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ABSTRACT

Each Learning Activity Packet in this series delineates performance objectives, procedures, materials, and references. Some also contain pre- and post-tests. They are primarily intended for the secondary level. The topics are: (1) Noise Pollution; (2) Georgia Ports Authority: Its Environmental Impact; (3) Environmental Experiencing; (4) Me in My Environment; (5) Lead Poisoning: A Health Problem in Savannah; (6) Weeds - Dandelion, Goldenrod, Ragweed, Crabgrass; (7) Honey Bees; (8) Non-Point Pollution; (9) Is a Dead Log Really Dead?; (10) Soil; (11) The Value of Composting; (12) Water Conservation; (13) Microecology: A Discovery Field-Oriented Activity; (14) A Healthy Ecosystem and the Concept of Diversity; (15) Living on the Water: Its Environmental Impact; (16) Working with Water; (17) Water: A Vital Resource; and (18) Hurricanes - A Threat to Our Environment. (TM)

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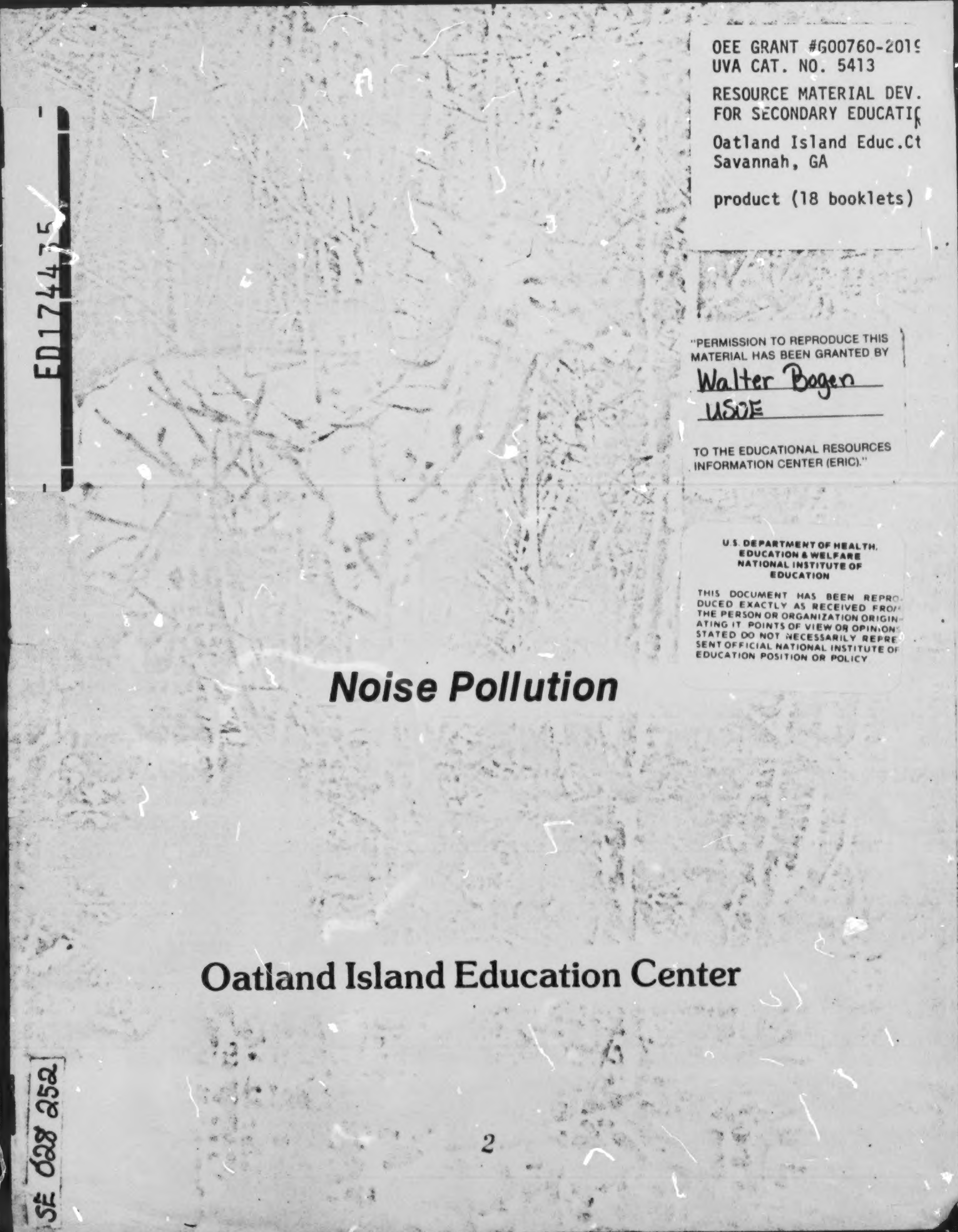

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Noise Pollution

Oatland Island Education Center

SE 028 252

NOISE

POLLUTION

BY

NANCY N. BRANNEN

INTRODUCTION:

Noise, derived from the Latin word nausea, is now defined frequently as an undesirable, unwanted, or annoying sound. The technological advancements that have occured in the past several decades have resulted in an ever-noiser environment.

Because of the increase in noise pollution, it has become a serious environmental health problem. Noise can cause effects which result in physiological, psychological, and psychophysical damage. Studies have shown that noise at intervals of long duration, besides resulting in the loss of hearing, damages the heart and vision, causes fatique, deprevation of sleep, and general body stress (physiological effects). Noise also hinders respiratory or vocal capabilities (psychophysical effects) and produces indigestion, stomach ulcers, builds up hypertension and causes mental disorders that sometimes lead to suicide or irrational behavior (psychological-effects). A sudden noise or "startle effect" may even result in momentary upsets in several body systems.

The noise report of the Johnson Administration in 1968 stated that overall loudness of environmental noise is doubling every ten years. Thus noise is becoming an environmental hazard to be ranked with air and water pollution. Industries and corporations have more right to dump noise on communities than they do air and water pollution.

Like other forms of pollution, noise can be controlled or suppressed by using one or more approaches or methods. Current research is constantly adding to noise control technology. The problem of noise pollution has been brought into focus by the discovery that many teenagers have suffered permanent hearing loss following long exposure to amplified rock music. Early experiences with the supersonic boom which trails behind all supersonic aircraft showed that it was capable of breaking glass, shaking houses, triggering rock slides and making ears ring.

It is our duty as resonsible citizens to make our surroundings quieter for health as well as conservation principles. Teenagers should be made aware of the sources, location, and delecterious effects of noise pollution on the health of individuals and our society. They should also realize that noise can be supresses if we take the proper precautions and procedures to do so. "Lower the Noise Levels" might be a fitting slogan for today's youth for tomorrow's future to be a quieter, healthier environment.

PERFORMANCE OBJECTIVES:

Upon completion of these activities, the students will be able to:

1. Select a definition for noise pollution.
2. Identify several sources of noise pollution.
3. Define the term decibel.
4. Specify what decibel range is considered dangerous to the ear and well-being of humans.
5. Describe several of the physiological, psychophysical, psychological effects of noise.
6. Select a response criteria for measuring sound.
7. Compare the sound pressure levels (SPL's) at various locations in the home, school, and community.
8. Suggest some means by which noise can be controlled.

ACTIVITY I: How Does Sound Affect Behavior?

(Psychological Effects)

MATERIALS:

1. Tape recorder
2. Construction paper
3. Felt-tip markers

PROCEDURE:

1. Prepare a tape in which different kinds of music and sounds have been recorded. For example, on one third of the tape, record light classical music at a low volume level. Then on the next third record rock music at moderate volume level. On the last third record as many "everyday" noise as possible at an extremely loud volume.
2. Give the students three sheets of construction paper and felt tip markers. Refer to these as doodle equipment. The sheets should be numbered one, two, and three.
3. Tell the class that you are going to read a story to them and as they listen, they will be hearing different sounds from the recorder. These sounds should be used as "background" and when the sound changes they should go on to the next sheet, etc.
4. Turn on the tape and begin reading an interesting book or story.

QUESTIONS:

1. How did you feel during each third of the story?
2. What do your doodle sheets look like? Were the drawings or "doodles" different on each sheet?
3. At which part of the tape was it most difficult to concentrate on listening to the story?

ACTIVITY II: How Does Sound Affect The Vocal Or Respiratory System?

(Psychophysical Effects)

MATERIALS:

1. Tape recorder or record player.

PROCEDURE:

Have several students take turns reading orally a paragraph in a reading selection or a chapter in their science textbook. As the students read, play a tape on which various soft and loud noises have been recorded. Some examples might be soft music, a clock ticking, a dog barking, an ambulance siren, a firetruck siren, a chainsaw, birds chirping, a vaccum cleaner, etc. Gradually turn the volume up on the tape recorder as the students begin to read so that they may have to raise the volume of their voices as they read.

QUESTIONS:

1. What sounds made it difficult to concentrate on what you were reading?
2. What happened to the volume of your voice as you read a paragraph while listening to a loud noise?

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ACTIVITY III: What Is The "Startle Effect" Of Noise?

(Physiological Effects)

MATERIALS:

1. Paper bag or ballon
2. Pin

PROCEDURE:

While the students are quietly reading a story or lesson, blow up a paper bag or ballon and "pop" it with your hands or with a pin.

QUESTIONS:

1. What happened when you heard the paper bag (or ballon) "pop"?
2. What happens when you hear a loud noise such as a sonic boom, a fire drill alarm, or a loud explosion?

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ACTIVITY IV: How Does Noise Effect The Health Of The Human Ear?

MATERIALS:

1. A Resource person.

PROCEDURE:

Invite a doctor or hearing specialist to discuss what noises affect the health of the ear. Show diagrams of the ear and how noise affects the different parts.

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ACTIVITY V: Decibels As A Means Of Sound Level Measurement.

MATERIALS:

1. Chart on SPL's (Sound Pressure Levels)

PROCEDURE:

Display a chart showing a table of sound pressure levels (SPL's). Help the students to understand that decibels (DB) is a term used to measure sound pressure levels on the ears just as inches or meters are terms used to measure length of objects. A higher number of decibels would mean an increase in loudness and sound pressure of the ears. Contrast the levels of sound made by different chart. Point out the areas of danger and discomfort to the ear. Make the students aware of the fact that these noises do exist and are dangerous to our health.

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ACTIVITY VI: Response Criteria For Measuring Noises In Our Environment.

MATERIALS:

1. Tape recorder
2. Sound report form

PROCEDURE:

Have the students visit different places in the community, school, and at home, in which they will determine the levels of noise pollution. A reponse criteria should be established and a tape recorder provided in which these noise levels can be recorded. An example of a response criteria for a sound report form might include:

1. Painfully Loud Sound
2. Limited Amplified Speech
3. Maximum Vocal Effect
4. Very Annoying
5. Annoying
6. Intrusive
7. Quiet
8. Very Quiet

Some place that the class might visit and report on could include:

1. Classroom-determine levels of noise during different times of the day.
2. School-lunchroom, library, school playground.
3. Community-Savannah Airport (Travis Field), Savannah Electric and Power Company, Savannah River Plant), Abercorn Expressway, city park (such as Forsyth Park), a construction site (where houses or buildings are being built), a broadcasting stuido (such as WSGA, WTOC, or WJCL).
4. Home-determine what appliances and electrical equipment are noise pollutants and which rooms they are housed in. For example: kitchen (dishwasher, blender, radio, refrigerator, can opener, etc.)

Upon returning to the classroom use these questions as guides in your discussion:

1. Home: In what rooms in your home were the SPL's the noisest?
2. What appliances are the worst noise pollutants?

1. School: In what areas of the school were the SPL's the highest?
2. In what areas of the school were the noise levels the lowest?
3. When is the classroom the noisest? The quietest?

1. Community: What places that we visited had the highest SPL's?
2. What might have been the dB's of the noises?

1. General: What was the loudest sound that you heard?
2. Did you hear any noises that you never heard before?
3. Did you think all these noises were necessary?

ACTIVITY VII: Response Criteria Report For Noises In Our Environment.

MATERIALS:

1. Chart or poster paper.
2. Felt-tip markers.

PROCEDURE:

The class will individually or in small groups make a chart or table on the response criteria recorded on their sound report forms when visiting the various locations. An example of this chart could be:

RESPONSE CRITERIA REPORT

Our Homes	At School	In The Community
dishwasher-annoying	library-quiet	Travis Field-very annoying.

Using city map the students can plot with different color pins the sources of various types of sounds (SPL's) and noises form the response criteria recorded. The significance of using the color pins might might be to represent the different criteria: Red-Very Annoying Yellow-Intrusive Green-Quiet Blue-Very Quiet.

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ACTIVITY VIII: Suppressing Unnecessary Noises - Controlling Noise Pollution.

MATERIALS:

1. Resource person
2. Poster paper.
3. Felt-tip markers.

PROCEDURE:

1. Have a resource person from the Environmental Protection Agency or from one of the Industrial Companies discuss noise pollution and what is being done to alleviate it.
2. Have the students make charts of their findings and present ideas on how noise levels can be decreased in the home, the school, and in the community (including industries). An example of this chart might include:

WAYS TO DECREASE NOISE LEVELS

Home	School	Community
Lower volume of radios and T.V.'s.	Speak in moderate voices	Quieter engines and exhaust systems
Noise-reduced appliances	Sound-absorbing ceilings.	Government regulations on noise levels.

VOCABULARY:

1. Noise - unwanted sound; sound of no value.
2. Decibel - a unit for measuring sound pressure on the ear.
3. Sound Pressure Level - the intensity of pressure of the sound vibrations on the ear.

EXPANSION ACTIVITIES:

1. Design and develop posters or slogans for suppressing noise pollution.
2. View the film, "Noise, The New Pollutant."
3. Make a scrapebooks or drawing depicting aspects of noise pollution.

4. Cut out newspaper clippings and write articles about noise pollution.

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2. Elements Of Environmental Health; Newton, David F.. Columbus: Charles E. Merrill Publishing Co., 1974.
3. Noise And Society; Rodda, Michael. London: Oliver and Boyd, 1967.
4. Your Environment And What You Can Do About It; Saltonstall, Richard, Jr.. New York: Walker and Company, 1970.

TABLE OF SOUNDS

Response Criteria	dB*	Sound Source
	150	
	140	Aircraft carrier deck
Painfully loud		
Limited amplified speech	130	
	120	Jet aircraft flyover (200 ft.)
Maximun Vocal Effort		Discotheque (rock band)
	110	Chainsaw
		Riveting machine
	100	Motorcycle
Very Annoying		Heavy truck (50 ft.)
Hearing Damage (8 hours)	90	Power lawnmower
		Heavy Traffic (50 ft.)
Annoying	80	
Telephone use difficult	70	Freeway traffic (50 ft.)
Intrusive		Dishwasher
	60	Conversational speech
Quiet	50	Business office
	40	Average residence-homes
Very Quiet	30	Library
		Soft Whisper (15 ft.)
	20	Broadcast studio
Just audible	10	
Threshold of hearing	0	

*Typical A-Weighted sound levels taken with a sound-level meter and expressed as decibels on the scale. The "A" scale approximates the frequency response of the human ear.

Source: First Annual Report of the Council on Environmental Quality.

Pre and Post Test

1. I. Match the words with their definitions:

_____1. decibel

_____2. startle effect

_____3. noise

_____4. sound pressure level

_____5. response criteria

a. an unwanted sound.

b. evaluation of sounds.

c. from different sources.

d. a sudden shattering sound

e. unit for measuring sound.

II. Name at least five sources of noise pollution in (a) the home (b) the school and (c) the community.

III. Match the following terms:

_____1. hearing loss

_____2. hypertension

_____3. loss of speech

_____4. deprivation of sleep

a. psychological

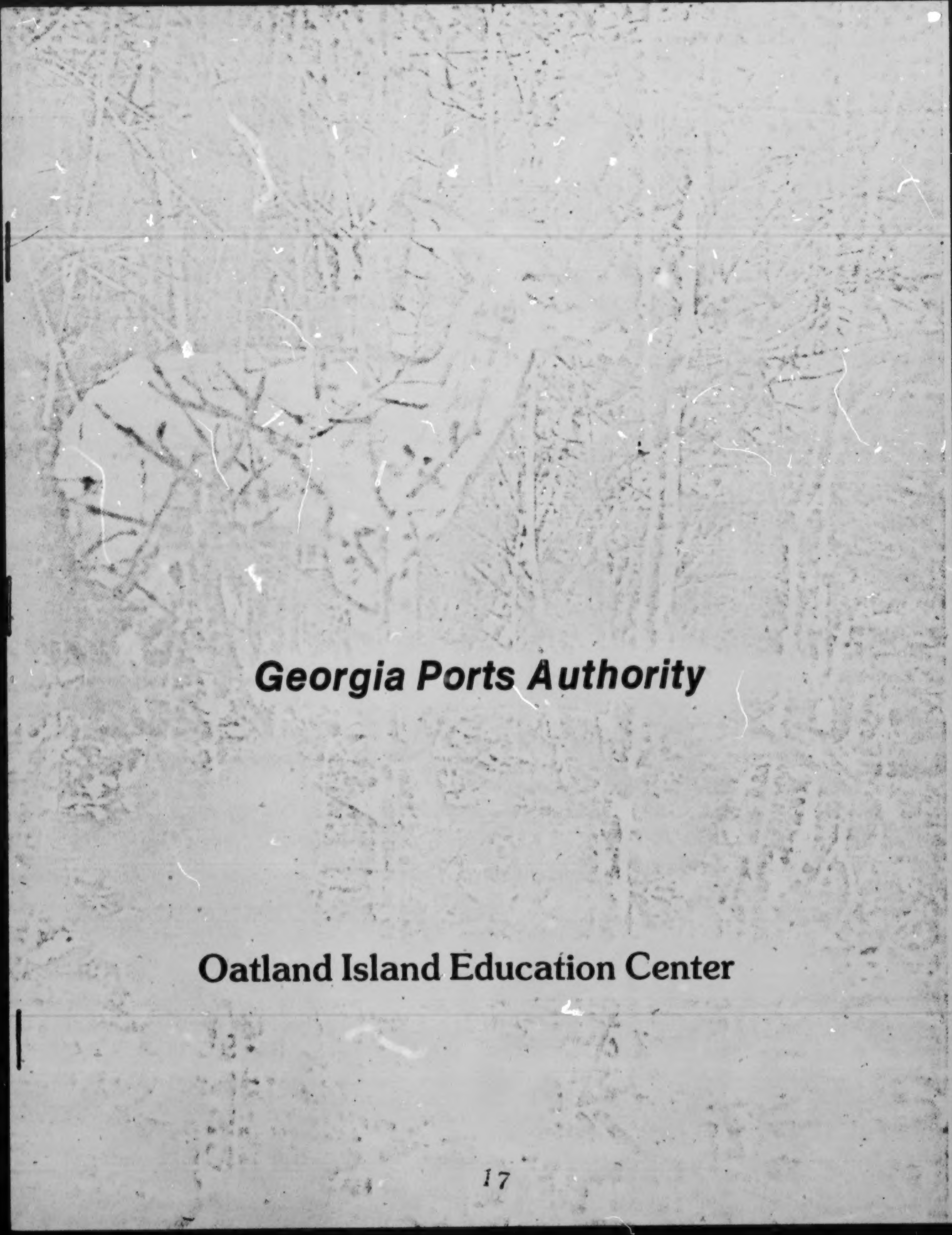
b. psychophysical

c. physiological

IV. What response criteria would you give for each of the following:

1. dishwasher
2. electric chainsaw
3. dogs barking
4. broadcasting studio
5. library

V. Name at least five methods of controlling noise in (a) the school (b) the home and (c) the community.



Georgia Ports Authority

Oatland Island Education Center

THE GEORGIA PORTS AUTHORITY: ITS ENVIRONMENTAL IMPACT

By

Debra Cubbege

Sharon Flowers

INTRODUCTION:

A lap is Learning Activity Packet. This is a lap on the Environmental Impact of the Georgia Ports Authority. This topic was chosen because it relates to our immediate area, it is environmental in nature, and it relates to social studies.

An important factor in the teaching of this lap is to note that the activities involved are multi-level and multi-option. Therefore, it is possible to adapt the activities to any level of instructions. The lap is designed to facilitate the use of various teaching methods, making it possible for the individual teacher to adapt this packet to the needs of her students.

In the beginning, the teacher should be familiar with all aspects of this lap. The teacher should note that the students are not expected to do every activity within this packet. The activities which are chosen should reflect the goals of the individual teacher.

It is of utmost importance to obtain the packet of brochures from GPA. These brochures will be used throughout this lap. Brochures are available by contacting the GPA. Georgia Ports Authority P.O. Box 2406, Savannah, Georgia 31402 - 964-1721.

PURPOSE:

The purpose of this lap is to familiarize students with the Georgia Ports Authority. Its functions, its environmental impact, and also future environmental developments.

OBJECTIVES:

Upon completion of the activities contained in this packet, students will be able to:

1. Define GPA.
2. Give reasons why the GPA is located on the Savannah River.
3. Explain the functions of the GPA.
4. List what job opportunities are available at the GPA.
5. Explain the environmental impact of the GPA on the Chatham County Area.
6. Discuss the future environmental developments of the GPA.

discuss its possible impact on

PRE-TEST:

1. Where is the Georgia Ports Authority located?
2. What are some of the functions of the GPA?
3. Name some of the jobs dealing with the environment at the GPA?
4. What is the economic impact of the GPA on our community
5. What are some of the products that are imported and exported through the GPA?
6. What types of transportation are involved at the GPA?
7. What are some of the Southeastern ports involved with the GPA?
8. What do you think are some of the future environmental impacts the GPA will have on our community?

POST TEST:

1. List the advantages of the location of the GPA.
2. What are some functions of the GPA and how do they affect our environment?
3. Name some of the jobs dealing with the environment at the GPA.
4. How has the economy of our community been affected by the GPA?
5. What are some of the products that are imported and exported through the GPA?
6. What types of transportation are involved at the GPA and how do their services benefit the GPA?
7. What are some of the Southeastern ports involved with the GPA?
8. List one of the future environmental develoments at GPA and discuss its possible impact on the community and the GPA itself.

ACTIVITY 1: What Is The GPA?

Schedule a field trip to the GPA. Contact Mr. Jim Bisson at the GPA, phone - 964-1721 - ext. 216.

Sample listing of questions for field trip:

1. Ask about and look for the different types of jobs at the GPA.
2. Look for different types of machinery and discuss their functions.
3. Ask about the different types of berths and the new berth under development.
4. Ask about the methods of ship loading.
5. Ask about the functions and importance of GPA's own railroad.
6. Discuss what you saw at the GPA. (such as ships, berths, machinery, etc ..)
7. Draw a picture of something you saw at the port and discuss it with the class.
8. Suppose a friend of yours did not go on the field trip, write a report explaning to him what the GPA is.

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ACTIVITY 2: What Is The Location Of The GPA?

A: Have the students obtain a chart of the Georgia Coastal Area, and have them locate the GPA and draw a ship at it's general location.

MATERIALS:

A map of the Savannah River.

B: According to a map of the Southeastern States, give the cardinal direction of the GPA from:

1. Atlanta, Georgia
2. Columbus, Georgia
3. Jacksonville, Florida
4. Birmingham, Alabama
5. Find the approximate latitude and longitude of the GPA.

MATERIALS:

A road map or any map showing latitude and longitude.

C: On a map of the Southeast have the students locate the five Southern Ports listed below:

1. Savannah
2. Brunswick
3. Charleston
4. Tampa
5. Mobile

MATERIALS:

A map of the Southeast States.

D: On a map of the Southeast States, locate the following terminals in Georgia.

1. Savannah
2. Brunswick
3. Augusta
4. Columbus
5. Bainbridge

Research and label the 7 Southeastern States in the port system.

MATERIALS:

GPA Brochure

Map of Southeastern States

ACTIVITY 3: Functions Of The GPA

A: Have students discuss and prepare a presentation on one of the topics.

Suggested Topics:

1. What jobs do cranes do?
2. What types of ships are used as merchant vessels?
3. Listing of cargo coming into the GPA.
4. Palate loading vs container loading.

B: Make a display, using pictures of products imported and exported through the GPA.

MATERIALS:

GPA Brochure
International Trade

C: Have students study the different types of ships and how each is used in the shipping industry.

REFERENCES:

1. First Book Of Ships; Bendick, Jeanne.
2. True Books Of Ships And Seaports; Carter, Katherine J.
3. Ships Of Commerce; Colby, Carroll B.
4. Ships At Work; Elting, Mary.
5. Cargoes; Huntington, Harriet E.
6. You And American Life Lines: A Story Of Transportation; Lewellen, J.B.

D: Invite a Representative from the GPA to the class to give a talk about the GPA.

RESOURCE PERSON:

Mr. Jim Bisson at GPA - 964-1721 Ext. 216.

E: Research the economic impact the GPA has on the Southeast.

MATERIALS:

International Trade And Industrial Survey; 1963.

F: List some major industries located in the Savannah area that either export or import goods thru the GPA.

MATERIALS:

International Trade

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ACTIVITY 4: Jobs At GPA

A: Using the field trip as a reference, have the students complete a listing of jobs available at the GPA.

B: Have students draw pictures of jobs related to the functions of GPA and discuss the importance of each job.

C: Have groups of students present a play to the class on the jobs being done.

D: Using the map and legend in the brochure International Trade, have students give an approximate total of persons employed by the GPA in the State of Georgia.

E: Research the International Longshoreman's Association and how it affects the GPA employees.

F: Have each student select one of the following occupations and research their duties at GPA:

1. Security Guard
2. Longshoreman
3. Administrative Personnel

4. Railroad Workers
5. Warehousing Employees
6. Dock Employees
7. Maintenance
8. Truck Driver
9. Machine Operators
10. Customs Inspector

G: Research the importance of the railroad to the GPA:

Suggested Topics:

1. The Railroad within the GPA.
2. The Railroad System in the Southeast.

MATERIALS:

Industrial Survey, 1976.

H: Have students research and discuss the jobs at the GPA which have to do with environmental control.

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ACTIVITY 5: Economic Impact On Community

A: Research and discuss one of the following economic impacts of the GPA on Georgia.

1. Revenue
2. Taxes
3. Employment

MATERIALS:

International Trade, 1976.

B: Research the impact of the GPA on the transportation system in Georgia.

MATERIALS:

Industrial Survey, 1976.

C: Have students research the impact of automation and machinery on the employment at the GPA.

D: Have students research and discuss the extent that the GPA adds to the pollution of our community.

E: Have students determine what type of transportation are involved in the importing of goods to the GPA?

F: Have students determine what population changes have resulted in our area because of the GPA.

RESOURCES:

Garden City Chamber Of Commerce

G: Have students research and write a report on commercial businesses that have opened as a result of the GPA's location in the Garden City Area.

RESOURCES:

Garden City Chamber Of Commerce

H: Have students determine what cities in this area are most affected as far as employment is concerned by the GPA's location.

RESOURCES:

Garden City Chamber Of Commerce

I: Have students research and discuss the effects of Industrial Solicitation on the influx of industries in our area as it relates to the Georgia Ports Authority.

Suggested Topics

1. Discuss the Red Carpet Treatment of Southern Business.
2. Discuss the State Department of Trade and Industry and its function in relation to incoming businesses.
3. Research the failures, successes, and current efforts of Industrial Solicitation in our area.

RESOURCES:

1. Savannah Chamber Of Commerce.
2. Public Relations Department of Georgia Ports Authority.
3. State Department of Trade and Industry.

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ACTIVITY 6: Future Environmental Impact of The GPA on Our Community

A: Have students research and discuss the developments and possible influence of the Colonel's Island Deepwater Industrial site in Brunswick, Georgia on the GPA.

MATERIALS:

Georgia Ports Authority - Colonel's Island Deepwater Industrial Site.

B: Have students discuss the environmental and industrial impact the new berth will have on the GPA.

C: The GPA has recently purchased some land on Hutchinson Island. On a chart of the Port and Harbor Facilities, locate Hutchinson Island. Research and discuss the possible impact this land, when developed, will have on GPA.

MATERIALS:

Port and Harbor Facilities Brochure.

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EXTENSION ACTIVITIES:

1. Construct a mural showing the different facets of the GPA.
2. Compile a scrapbook of pictures using magazines and drawings. of different jobs and activities at the GPA.
3. Select and read a book on a topic related to shipping and industry and make an oral presentation to the class. Demonstrate how the topic relates to the GPA.
4. Using models of ships, trucks, etc... make a model of the GPA.

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Ships Of Commerce; Colby, Carroll B.

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2. The Seaport
3. Transportation by Inland Waterways.

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1. Georgia Anchor Age - A Bimonthly Magazine.
2. The International Ports Of Georgia.
3. Do You Import And Market Products In The Southeastern USA?
4. Port And Harbor Facilities.
5. Industrial Survey, 1976.
6. International Trade.
7. GPA - Colonel's Deepwater Industrial Site.

RESOURCES AGENCIES:

1. Georgia Ports Authority
   P.O. Box 2406
   Savannah, Georgia 31402
   912/964-1721 Ext. 216
   Mr. Jim Bisson - Public Relations
2. Savannah Chamber Of Commerce
   301 W. Broad Street
   Savannah, Georgia
   233-3067
3. U.S Department Of Corp of Engineers
   200 E. St. Julian Street
   Savannah, Georgia
   Public Affairs - 236-1863

4. General Services Adminstration

Maintenance Warehouses - Garden City Terminals - 964-0354.

5. Natural Resources Department

Air Quality Control
232 E. Lathrop Ave.
Savannah, Georgia
944-2206

6. Department Of Natural Resources

Environmental Protection Agency
Brunswick, Georgia
Mr. Brandt - 912/264-7284

7. Georgia State Department

Of Trade and Industry

8. Georgia Ports Authority

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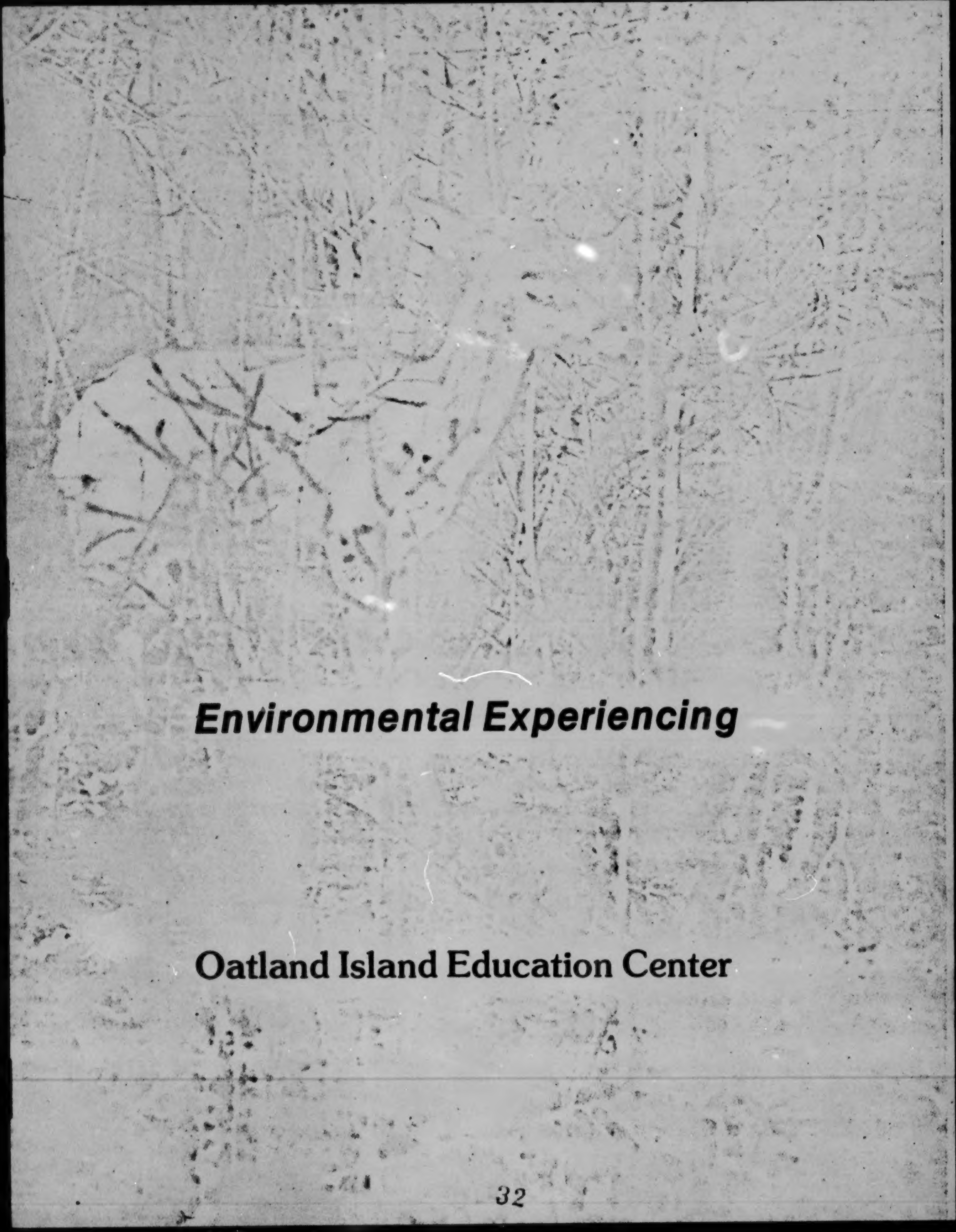

Environmental Experiencing

Oatland Island Education Center

ENVIRONMENTAL EXPERIENCINGS

By

Clyde Faison

Gloria Johnson

Patricia Reynolds

INTRODUCTION:

"Nearly everyone agrees that man's long, one sided war with nature must end. We have to stop ravaging the land, fouling the air, and spoiling the water. The question is: how to proceed? One beginning - certainly not the only one - is education. If we know what we are doing, we have a chance to change things." (James A. Sensenbaugh)

Today Environmental pollution is one of the most serious problems facing mankind. Air, water, and soil--all harmed by pollution - are necessary to the survial of all living things. Highly polluted air can cause illness, and even death. Polluted water kills fish and other aquatic life. Pollution of soil reduces the amount of land available for cultivation. Environmental pollution also brings ugliness to man's naturally beautiful world.

Everyone wants reduce pollution, but the pollution problem is as complicated as it is serious. It is complicated because much of the pollution is caused by things that benefit people. For example, exhaust from automobile causes a large percentage of all pollution, but the automobile provides transportation for millions of people. Factories discharge much of the material that pollutes air and water, but factories provide jobs for people. Also fertilizer and pesticides can damage soil, but fertilizers and pesticides are important to the growing crops.

We are all passengers on a beautiful spaceship, - Earth, and our present journey is threatened by our past and present failures to live within the system - nature - which supports life on the ship. Any action we take to sustain and strengthen the relationship between man and his environment will sustain and enrich life on the spaceship. Could there be any more important task for education than that?

GENERALIZATIONS:

There are certain pollutants that effect our environment such as carbon monoxide from automobiles and factories, pesticides and fertilizers and litter.

In nature, there is balance. Nothing can be changed without affecting other parts of nature.

To have students become aware that often there is no simple clear-cut, all encompassing answer to problems concerning environmental and ecological issues.

Man is generally responsible for prevention or containment of pollutants and contaminants are caused by either natural or man-made process.

Personal valves and society influence environmental decisions.

Students should become aware of resources issues, their associated problems, and management techniques affecting their outcome.

INTRODUCTION TO PROCESSES:

The function of this packet is to provide teachers and students, with a reference for developing a comprehensive environment-oriented curriculm.

The activities in this packet examine the causes verus the symptons of environmental problems and tries to engage students in the kind of activities that will produce responsible, evironmentally aware citizens. In short the packet address themselve to long as well as short range goals.

This packet can also serve as a catalyst for developing a unifying curriculm theme that could be continous from elementary to junior high. Further development of this environmental theme must be conducted at the local level by the person involved in the formal learning process.

It is anticipated that teachers and student will want to develop their own activities, drawing upon suggested ideas in this packet and from other sources. This procedure should lead to the development of an environmental education curriculum acceptable for local school adaption and adoption.

In addition to suggested activities, this packet contains a bibliography of teacher books and student books, educational films and filmstrips, a list of resource persons and agencies and a glossary of environmental terms.

There is no "best" way of using this packet, it precribes no singular proper order of activities, no rigid structure or detailed lesson plans. It is dependent upon teachers to "formulate their own plan" and to excerise initiative in using the suggested activities.

The cooperation of the total community is requires if an in depth study of the environment is to be fulfilled. Thus, it is suggested that the talents of interested community members be combined for involvement in an environmental education curriculm.

PERFORMANCES OBJECTIVES:

Upon completion of these activities, students will demonstrate the ability to:

1. Compare the effects of land, air, and water pollution on the environment.
2. Write a summary report after reading a short selection or viewing a filmstrip on pollution.
3. Interpret the findings of their study on environmental pollution and apply it to themselves and society.
4. Given a set of facts about pollution, make assumptions formulate hypotheses and test them.
5. Classify a number of environmental pollutants.
6. Collect and organize data to show how pollutants can be controlled.
7. Define terms related to pollution.

TOPIC: Count Up the Cost

PROCEDURE:

The goal of this activity is to have students discover the cost involved in cleaning up the environment.

Have student select a public area of their community that needs to be cleared of debris. Students should then organize themselves into data-gathering groups of 4-5 members. Each group should estimate the labor, equipment, rental and supervision costs involved in cleaning the area. Students should develop a plan of action for determining actual cost of the clean up and carry through this plan by contacting citizens in the community for cost data (city engineers, truck drivers etc.) This information will be recorded in a bookkeeping journal, using a cash journal and a payroll register. Each group should attempt to secure as much donated help as possible and must prepare two "Estimates of Cost" - one that include as much donated work as possible and a second one which details all expenses that would have to be met without donated help.

The "Estimates of Cost" financial statements can then be submitted to the City Council with a strong recommendation that the action be taken. Students might also wish to submit an article to the local newspaper and a do a community survey to determine the extent of community support for their plan.

MATERIALS NEEDED:

Money and the Real World; Davidson, Paul. New York, Wiley

Publishing Co. 1972.

Business Finance Handbook; Doris, Lillian, New York, Prentice Hall, 1953.

REFERENCE:

Environmetal Experiences p. 131.

COMPUTATIONS

State of Alaska, Department of Highways - Equipment Rental Rates for Equipment used for force account as payment for work performed.

EQUIPMENT RATES

Dump Struck	$12.50/hr.
Loader	18.50/hr.
Cat-Dozer	17.00/hr.

Taken from Contractor's weekly payrolls for union scales for classified labor work.

LABOR RATES

Foreman	$11.51/hr.
Dozer Operator	10.18/hr.
Loader Operator	10.85/hr.
Truck Driver	8.26/hr.
Laborer	7.05/hr.

Equipment rental rates include fuel, oil, grease, etc. for equipment during the work performed. Those rates are established as a cooperative effort between State and the Contractor.

TOPIC: Possum Creek Valley

PROCEDURE:

As individuals or as members of a team, students should put into practice selected principles of land management. Working from copies of land map, each students assumes roles and attempts to improve the quality of the area he is responsible for: watershed, game, timber, recreation, fire protection. The total class should then coordinate the separate management plans into one master plan through the use of the environmental principles and open ended discussions.

EXTENSION:

Invite a resource person from the Metropolitan Planning Commission to discuss land management principles:

Address: 2 East Bay St.
Phone: 236-9523
Reservation: Necessary

MATERIALS:

Management: Principles and Practices; McFarland, Dalton E., York, McMillian, 1964.

Management: Organization and Planning; McGraw Hill, 1963.

REFERENCE:

American Forest Institite

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TOPIC: Don't Be A Litterbug

PROCEDURE:

Have the entire class, choose a park or area of land that is heavily littered, and then have the class clean the area.

After a two week period return to the same area and reclean. Collect the litter and examine. Have students make assumptions as to how the park got into the same condition again, and try to come up with suggestions about what can be done to prevent future littering.

EXTENSION:

Some parks that you might visit are: Daffin Park, Forsyth Park, Can Park, or any park within walking distance. The class could plan a trip to Skidway Island State Park, Hours 7am-10pm.

MATERIALS:

Plastic bags

Rakes

REFERENCES:

Management: Principles and Practices; Bowman, Donald M. New York, McMilian, 1964.

FILM:

The Litterbug

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TOPIC: People Space

PROCEDURE:

This activity calls for the class to be divided into four groups. Have each group choose a section of the playground that they think is big enough to play in. Mark it off with a rope.

Then ask another group to come play in the same space. Now ask another group to come. Ask another.

Have students answer the following questions:

1. What happened to available space as more groups were added?
2. Did you have to change the way you played?
3. Did you like having so many people in your space?
4. Did it get noisy?
5. What about people's temper?

After students have gotten the general idea about over-population let them apply it to the world's over-population.

1. What will happen if the population of our world keeps growing at the present rate of 2% a year?
2. Do you think over-population will have an effect on our food supply, health, and shelter?
3. What possible solutions to over-population can you think of?

MATERIALS:

The Population Debate the Development of Conflicting Theories Up to 1900; Hutchinson, Edward Prince., Boston, Houghton Miffin., 1967.

The Population Crisis and the Use of World Resources; Mudd, Struart, Bloomington, Indiana, 1964.

Population Problems; Thompson, Warren Simpson, New York, McGraw-Hill, 1965.

REFERENCE:

Save the Earth; Miles and Nivola.

TOPIC: Putting Pollution In It's Place

PROCEDURE:

Have each student write a poem about pollution. After they have written their poems, ask some of the students to share their's with the class. The poems can be pinned on the bulletin board with the captain "Putting Pollution In It's Place".

MATERIALS:

Paper, pencils, and pins.

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TOPIC: Which Belongs Together?

PROCEDURE:

Have the students look through a selection and write words that relate to a certain category. A few suggested classifications are homes, factories, water, air etc.

Example: Solid Waste Disposal

Words relating to solid waste disposal may be fire and smoke odors, animal nuisances, wetlands and shoreline changes, disposal methods, etc. The students could be asked to discuss each or asked to alphabetize these topics for practice in this skill.

MATERIALS:

Pencils, and paper.

REFERENCES:

Social Science Staff of the Educational Research Council of America Industry: Man and the Machine; Allyn and Bacon, Inc., Boston 1971.

People Use the Earth; Weaver, Philip V., Silver Burdett Co., 1972.

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TOPIC: What Did It?

PROCEDURE:

Have students collect pictures, stories, and other information concerning pollution from all possible sources. Discuss each kind of pollution as to its description, cause and possible ways to eliminate.

MATERIALS:

Clippings from magazines and newspaper, Models, Speciments.

Pencil and Paper.

REFERENCES:

For Pollution Fighters Only; Hyde, Margaret.

Save the Earth! An Ecology Handbook for Kids; Miles, Betty.

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TOPIC: Savannah Speed-Way

PROCEDURE:

Discuss the ways automobiles effects the environment. Make a listing of these on the chalkboard. Discuss what life would be like without automobiles. It might be interesting to look into the noise pollution caused by cars--75% of all noise is created by cars.

MATERIALS:

None

REFERENCES:

The Fight For Quiet; Berland, Theodore.

Sound: From Communication to Noise Pollution; Chedd, Graham.

Ecology and Pollution: Air; Gutnik, Martin G..

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TOPIC: Factories Pollute Water

PROCEDURE:

Show students either pictures or a movie of factories polluting the water, have the students analyze the situation and answer the following questions:

1. Why do you think factories are often located near bodies of water?
2. Why do some industries discharge polluted water in a river?
3. Do you know any industries that empty waste materials into the Savannah River?
4. What effort are being made to discover other means of disposing of industrial waste?

EXTENSION:

Invite a Respresentative from a local manufacturing company to the class have the students present the above questions to the Company respresentative.

MATERIALS:

Problems of Conservation: Air

Factory Planning and Plants Layouts

Industrial Waste Disposal

REFERENCES:

1. People Use the Earth; Gantt, Walter N..

FILM:

The Gifts

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TOPIC: Mechanical Slaves

PROCEDURE:

Help students understand that there is no longer a necessity to use human slaves to do hard work. Machines can operate without rest, and that these are better converters of energy into work than humans. Students must be aware that modern man pays a price for this abundance of mechanical slaves, that price is pollution. Students can become familar with the number of slaves an average family use in a day, or week, or month. This can be determined in several ways. The automobile engine, one of the greatest sources of energy slaves, is the main polluter of the air we breathe. Electric generating plants use fossil fuels for energy. Our electrical slaves pollute the air every time we turn on a lamp or run a motor. If nuclear energy is used to fuel the generating plants, there is thermal pollution and possible some harmful radiation pollution. Have students compare the pollution caused by mechanical slave as ~~opposed~~ to non-pollution of human slave. They might discuss whether or not slavery should be put into effect because it could eliminate some of the pollution problems.

MATERIALS:

None

REFERENCES:

Industry: Man and Machine; Educational Research Council.

Pollution; Leisner, Robert S..

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TOPIC: The Mother Country

PROCEDURE:

The Industrial Revolution began in England and spread to the United States. It was characterized by development of factories overcrowded slums, and poor sanitation. Compare the pollution problems of England with those of the United States, past and present. Then compare the solutions that each country have undertaken.

MATERIALS:

None

REFERENCES:

1. Encyclopedia or any resource book on Industrialization.
2. Industry: Man and Machine; Educational Research Council.

****

TOPIC: Just Like You

PROCEDURE:

The cause of land, air, and water pollution that have been studied by the class is reviewed to consider similarities and differences in their orgin. After discovering how these three kinds of pollution are alike and different, compare the possible solution for the prevention of each.

MATERIALS:

1. Paper
2. Pencil

REFERENCES:

1. An Examination of the Economic Impact of Pollution Control Upon Georgia's Water Using Industries; Dobson, Winfred G..
2. Stop It; Sanders, Norman.

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TOPIC: Screen Test

PROCEDURE:

Students role-play residents and businessmen of an industrial city. In a special session of the town meeting, players are presented with conditions of environmental pollution of their city such as air, water and noise.

The player are given a list of abatement measures, Players then negotiates for specific pollution-control measures. During the negotiations the proposed controls are thoroughly analyzed in terms of social and financial cost to the community.

Once solutions are agreed upon, short-term and long-term consequences of decisions should be discussed by the participants.

EXTENSION:

Have a Respresentative from the Metropolitan Planning Comission give a presentation of the financial cost and social cost of cleaning up pollution.

Contact the Metropolitan Planning Comission
Address: 2 East Bay Street
Contact: Dave Powers - 912-236-9523

MATERIALS:

None

REFERENCES:

1. Principles of Argumentation and Debate; Capp, Glenn Richard.
2. Business Finance Handbook; Doris, Lillian.
3. Our Polluted World Can Man Survive?; Perry, John.

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TOPIC: The Silent Killer

PROCEDURE:

Have students make interpretations from the following information.

Smog is a combination of "smoke" and "fog". A killing smog usually includes severe temperation inversion. Perhaps the most familiar example of smog that caused a large number of deaths occurred in December of 1952 in London. It became a major killer when a high concentration of sulfur dioxide from soft coal fires used to heat homes built up in the ground air. Since 1958 when the Clean Air Act was passed, there has been steady improvements in London air, once considered one of the dirtiest and unhealthest cities in the world. London now rates far above New York, Los Angles and other comparable cities. This change is a notable example of how some governments have reacted to pollutions problems.

Have students compare London's pollution problem with major cities in the United States and Savannah as to their similarities and differences. Ask them what implications this has for Savannah and other cities?

MATERIALS:

Duplicated sheet with the above information.

REFERENCES:

1. Smog. A Report to the People; California Institute of Technology.
2. Our Polluted World Can We Survive?; Perry, John.
3. Environmental Education in the Elementary School; Sales, Larry and Lee.

****

TOPIC: What Do You Think?

PROCEDURE:

Have students bring some environmentally-related articles from newspapers or magazines to class. Have each student read aloud a sentence or a paragraph from an article. The remainding members analyze or interpret the sentence or paragraph.

EXTENSION:

Have a representative from the Savannah Morning News explain how reporters go about writing a article. Have the students question the Representative about possible bias information that has been noticed in the newspaper articles. Student might want to make a list of questions before the speaker comes.

Contact: Debby White
Telephone: 236-9511
Address: 111 West Bay Street
P.O. Box 1088
Reservation: Necessary
Age group: 12 & up

MATERIALS:

1. Newspaper articles and magazines articles.
2. Transportation for field trip.

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TOPIC: **Raid**

PROCEDURE:

Schedule a field trip to the Mosquito Control Comission-Chatham County. Ask question about pesticides used in mosquito control. While taking the tour have the topic organic chemistry (pesticides) emphasized.

Some questions to ask are as follows:

1. The effect of insecticides on our environment.
2. What types of insecticides are use to control the mosquito population?
3. Do any of the pesticides kill non-target organism?
4. Can the pesticides accumulate in food chains?
5. Do pesticides lower the reproductive potential of some organisms?

MATERIALS:

Transportation

REFERENCES:

1. *Chemistry, Man and Environmental Change and Integrated Approach*; Giddings, Calvin J..
2. *Pollution*; Leisner, Robert S.

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TOPIC: QUESTIONAIRE

PROCEDURE:

Develop a questionaire to determine the following:

1. If a people in the community feel that the prevention of pollution is important?
2. What, If anything, have they done to prevent pollution?
3. If they have noted any serious effects from pollution?
4. What they believe are the main causes of pollution?

MATERIALS:

Paper

Pencil

REFERENCES:

1. *Survey Methods in Social Investigation*; Kalton, G.A. and Moser, C.A.
2. *Fragebogen the Questionaire*; Salomon, Earnest Von.

TOPIC: **Bulletin Board**

PROCEDURE:

Have students construct a bulletin board depicting how air, land, and water have become polluted and how pollution can be prevented. Students might use pictures that they have taken of polluted areas in the country.

MATERIALS:

1. Construction paper
2. Pictures of polluted areas.
3. Stapler
4. Scrissors
5. Bulletin board paper

REFERENCES:

"Pollution, A Teaching And Action Program", Teacher; Needhah, Dorothy.

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TOPIC: **Letters of Protest**

PROCEDURE:

Have students write letters of protest to their Congressmen about environmental problems. They might also write letter to the city mayor and County Commissioners requesting that legislature be passed to support pollutions programs.

EXTENSION:

One program to consider is SOS (Stamp Out Smog). Have students form a program similiar to SOS. Write: Stamp Out Pollution Los Angles, California.

MATERIALS:

1. Paper
2. Pencil
3. Envelopes
4. Stamps

REFERENCES:

1. The Art of Writing Effective Letters; Fruchling, Rosemary.
2. "Letters & Petitions"; Sanders, Norman.

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TOPIC: Where Do We Go From Here?

PROCEDURE:

Present the following to students:

Each day the custodians of the School burns waste paper. In some cities this is illegal, because it adds to air pollution. The people who run the school think this practice is not harmful to the environment, is cheaper than hauling the paper to a sanituary landfill, and less trouble than recycling.

Let students discuss the followings statements and criticize or comment on them.

1. Custodians- like burning the waste-paper because it is easy. They also believe it is cheaper than hauling it to a dump, saving time and money.

2. Women in Neighborhood- Do not like the waste-paper burning because ashes fall on their homes and also makes their clothes dirty when hanging on the line to dry.
3. Company that Sells Recycled Paper- feel paper products are too valuable to burn. If the paper is collected and sent to the factory, it can be recycled.
4. Government- wants to do the best thing and operate as cheaply as possible. A little air pollution won't do any damage and the present system of burning is cheaper.

After students have criticized the above situation let them come up with a compromise to the situation.

MATERIALS:

1. Duplicated sheets with the above information.

FILMS:

1. Burn, Bury or What?

REFERENCES:

1. Stop It!; Sanders, Norman K.
2. Reuse and Recycle of Wastes; The College of Engineering University of Rhode Island.

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TOPIC: Talking Away

PROCEDURE:

Ask the students to take a newspaper magazine, or textbook article related to an aspect of environmental pollution. After reading the article, have each student carefully delete each sentence that represents a bias point of view.

MATERIALS:

1. Newspapers
2. Magazines
3. Textbook
4. Pencil and paper

REFERENCES:

None

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TOPIC: You Are There!

PROCEDURE:

Present the following to the class:

The colonist in Pennsylvania obtained water from a small river running through their village. As their amount of livestock increased, the colonist needed to build several new barns and barnyards. Some of the colonists wanted the barns and barnyards built near the center of the community. Another groups wanted the barn and barnyards built up the river. The last group wanted the barns built down the river. Here are the facts:

1. If the barnyard is built near the center of the village, it will create a sanitation problem.
2. If the barn is built upstream, the colonist water supply will become contaminated.
3. If it is built downstream, the colonist will have to haul hay quite a distance, but this location will not contaminate the village water supply.

Divide part of the class into three groups. Let each group take either view 1. 2, 3. Give each group the same amount of time to present its view. Let the remaining members of the class decide where the barn and barnyards should be built.

MATERIALS:

None

REFERENCES:

1. Decision-Making; Education Forum, Vol.40 73-7 Nov. 1975.
2. Pollution and Public Policy; Denhardt, Robert B. and Paulson David F.

****

TOPIC: **Prove It**

PROCEDURE:

Divide the class into small groups. Each group is to choose one of the following to analyze, reject or support.

1. There are certain pollutants that effect our environment such as carbon monoxide from automobiles and factories, pesticides and fertilizers and litter.
2. In nature, there is a balance, nothing can be changed without affecting other parts of nature.
3. There is no simple clear-out, all encompassing answer to problems concerning environmental issues.

Each group may use reference material they need to assist in arriving at some conclusions.

MATERIALS:

None

REFERENCES:

1. Creative Teaching of the Social Studies in the Elementary School; p.152.
2. Toward Effective and Equitable Pollution Control Regulations; Buggie, Frederick.
3. For Pollution Fighter Only; Hyde, Margaret O.
4. Pollution; Leisner, Robert.
5. Our Polluted World Can Man Survive?; Perry, John.

****

TOPIC: Fish, Fish

PROCEDURE:

Schedule a field trip to a Seafood Packing House. Have students prepare a list of questions that they would like answered about the effects of pollution on the fishing industries.

Sample list of questions:

1. Over the last ten years has the supply of fish or seafood increased or decreased?
2. If the supply of fish has increased, what do you contribute to the cause, if it has decreased, was water pollution indirectly or directly involved,
3. What effects if any has pollution had on the fishing industry?
4. What action has the fishing Industry taken to end water pollution?
5. Could you make suggestions as to what could be done to prevent further water pollution?

MATERIALS:

Transportation

REFERENCE:

1. *Who Has Poisoned The Sea?*; Copard, S.G.
2. *Our Dirty Water*; Elliott, Sarah.

FILM:

1. *Land of the Sea*; Savannah Public Library.

TOPIC: Here Comes the Judge!

PROCEDURE:

Select one member of the class as the judge, two for lawyers, one for the plantiff and one for the defense. Let the remainder of the class serve as the jury. One lawyer represents a large corporation that would like to build a factory in the community. The factory will, however, create environmental pollution. The other lawyer representing the plantiff will oppose the new factory because of the adverse effects the pollution would have on public health. Each lawyer will give an opening statement and call witnesses to testify on his client's behalf. The witnesses may be students who represents various interest in the community. After the case is over and the closing statements made, the jury will weigh the evidence and vote either for the plantiff or defense explanning why they voted yes or no. The judge will then decide the case or offer a compromise to the problem.

Prior to the case each class member should research the topic of concern.

EXTENSION:

1. Schedule a Field trip to the Chatham County Courthouse. Observe the way the court is set up, and the judiciary functions.
   Contact: Bill Hampton Telephone: 233-2257
   Address: 127 Bull Street Box 8161
2. Invite a lawyer to the class to discuss the judiciary functions Another possible extension is to invite a representative from a factory and one fron Environmental Agency and let the lawyer questions them about pollution policies and have the class members serve as the jury.

MATERIALS:

None

REFERENCE:

1. For Pollution Fighters Only; Hyde, Margaret.
2. Toward Effective and Equitable Pollution Control Regulations; Buggie, Frederick.
3. The Machinery of Justice: An Introduction to Legal Structure And Process; Mayers, Lewis.

****

TOPIC: What Happened?

PROCEDURE:

One Morning, just before your students get to school turn over some desk or put enough desk in the classroom to make it over crowed. Throw paper over the floor. Leave something in the room overnight that will cause an offensive odor. Turn the record player up at a level that will make it disturbing.

1. Have students make assumptions as to what they think happen.
2. Have them relate this situation to problems in real-life as to the implication it will have if we continue polluting the environment at our present rate.

MATERIALS:

1. Classroom
2. Paper
3. Something to make an odor.
4. Record player or radio

REFERENCE:

None

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TOPIC: Burn Baby Burn!

PROCEDURE:

Present the following to the students. The local disposal site has been closed. Trash must now be hauled to the nearest approved site 35 miles away or disposed of individually. People are reluctant to drive 35 miles to dispose of their trash. If everyone starts burning their trash it will add to the air pollution problem.

Have the students:

1. Design a law that will make illegal to burn waste paper products.
2. Design a law that makes it illegal to burn paper products without a device to clean the smoke before coming out of the chimney.
3. Make recommendations to the local government that will provide for an adequate disposal facility near the community.

MATERIALS:

None

REFERENCE:

1. Reference books about government.
2. Toward Effective and Equitable Pollution Control Regulation; Buggie, Frederick D.

FILM:

Burn, Bury or What?; Savannah Public Library.

****

TOPIC: Vote For Us

PROCEDURE:

Initiate a school-wide poster contest concerning anti-pollution. Let a class judge the winning poster. Give a small prize for the winning poster. Posters should show that every citizen needs to be informed about the causes of pollution and its cures.

MATERIALS:

1. Tag board
2. Paint
3. Crayons
4. Paint brushes

REFERENCES:

None

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TOPIC: Martian For A Day

PROCEDURE:

Ask students to visualize the following situation: "There are human-like creatures on the plant Eros. This planet is almost identical to the planet Earth. One day, a Erostian spaceship land in Savannah. The Erostians explain that the water, air, and land on their planet has become polluted. They have heard that the planet earth once had the same problems and had worked out solutions. The Erostians would like an student to return to Eros to help them solve their pollution problem".

Present the following questions to the class:

1. What do you think the planet would look like when you arrived?
2. Do you think you could use the same solutions to solve their pollution problems that were used on earth?
3. How would you go about solving their pollution problems?

Make a comparsion of the planet Earth, using only the imagination.

MATERIALS:

None

REFERENCE:

1. Our Polluted World Can Man Survive?; Perry, John.
2. Save the Earth: An Ecology Handbook For Kids; Miles, Betty.
3. For Pollution Fighters Only; Hyde, Margaret.

****

TOPIC: Cassandra - You Are The Survivors:

PROCEDURE:

Tape the following message: "This is a voice print of your survival computer. My name is Cassandra. You are now in in your future. I am sorry to inform you that as a result of world pollution, it is no longer safe for you to be unprotected from contamination. Because of this, you have been placed in a protective environment. You will remain in this cell unless you can design a plan that will restore the planet Earth".

Let students use their imaginations to design factories, cars, and sewage plants that will help rectify pollution problems.

MATERIALS:

1. Tape recorder
2. Cassette
3. Paper and pencil

REFERENCE:

1. People and Their Environment; Brennan, Mathew J.
2. Man In The Environment; Moore, Ruth.
3. For Pollution Fighters Only; Hyde, Margaret.

****

TOPIC: A Fish In The Sea

PROCEDURE:

Have the students pretend that they are a fish living in a badly polluted river.

Present the following questions:

1. What would be your attitude toward the people who polluted the water?
2. What suggestions would you make to help solve the problem?
3. How do you think the polluted water would effect your health?

MATERIALS:

None

REFERENCES:

1. Who Has Poisoned The Sea?; Coppard, S.G.

2. The Water We Drink; Bloome, Enid.

****

TOPIC: Problems and Issues

PROCEDURE:

Present a copy of the following selections to each students, and have he or she write a summary report.

Interest in pollution problems has increased since individuals have learned that life on this planet is at stake.

Current data indicates that air pollution is the most immediate threat to human survival. Resolution of this environmental crisis requires ecological analysis and positive action.

Scientists have predicted that, unless effective action is taken by 1980 city dwellers will have to wear gas masks to survive, nevertheless many people in some American cities will die as a result of air pollution by 1985, air pollution will have reduced by half the amount of sunlight reaching the earth; in the 1980's new diseases will reach epidenic proportions as a result of breakdowns in the major ecological system; the earth's temperature will be significally affected by increased carbon dioxide in the atmosphere; Polar ice caps will melt, and cause flooding; rising noise levelswill cause sharp increases in heart diseases and hearing disorders; a accumulation collection of residua; DDT in humans will seriously harm public health.

EXTENSION:

After the students have completed their summary reports, have them answer the following questions:

1. Are people aware of the major environmental problems in their communities?
2. What are major causes of pollution in our area?
3. What are we doing to allieviate the problem?

Plan a trip to the Chatham County Health Department-Environmental Health Division.

Address: 2011 Eisenhower Drive

Contact: Al Baker Telephone: 356-2170

Find out how the environmental health program checks housing, wells, sewage disposal and rodent control. Make a list of question concerning the effects pollution has had on health, and the diseases related to pollution.

MATERIALS:

None

REFERENCE:

1. Our Polluted World Can Man Survive; Perry, John.
2. The Environment of America Present/Future/Past; Jones, Thomas C.

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TOPIC: Pollution Bingo

PROCEDURE:

The purpose of the game is to introduce student to the vocabulary and concepts of pollution. It might serve as an activity for review and reinforcement. The playing format is similar to the familiar bingo game. Construct a card with terms related to environmental pollution. The definition of the words are placed in a container. The caller reads the definition aloud. The first player to fill a row going down or across is the winner. The winner then calls the definitions.

MATERIALS:

1. Poster board cut into 5X5 pieces.
2. Marker
3. Cover disk
4. Strips for definitions

REFERENCE:

Glossary

****

TOPIC: Pollution Detective

PROCEDURE:

Have students determine if there is a local factory polluting the air with smoke. If there is have them make a record of the pollution. Every day for a week, at the same time of day, stand in exactly the same place, and take a photograph of the factory. Write down the day, the time and the place in a notebook when the pictures are developed, you will have proof of pollution. Then find out what agency in your town or city is in charge of controlling air pollution and take the evidence of pollution to that agency.

Research the following:

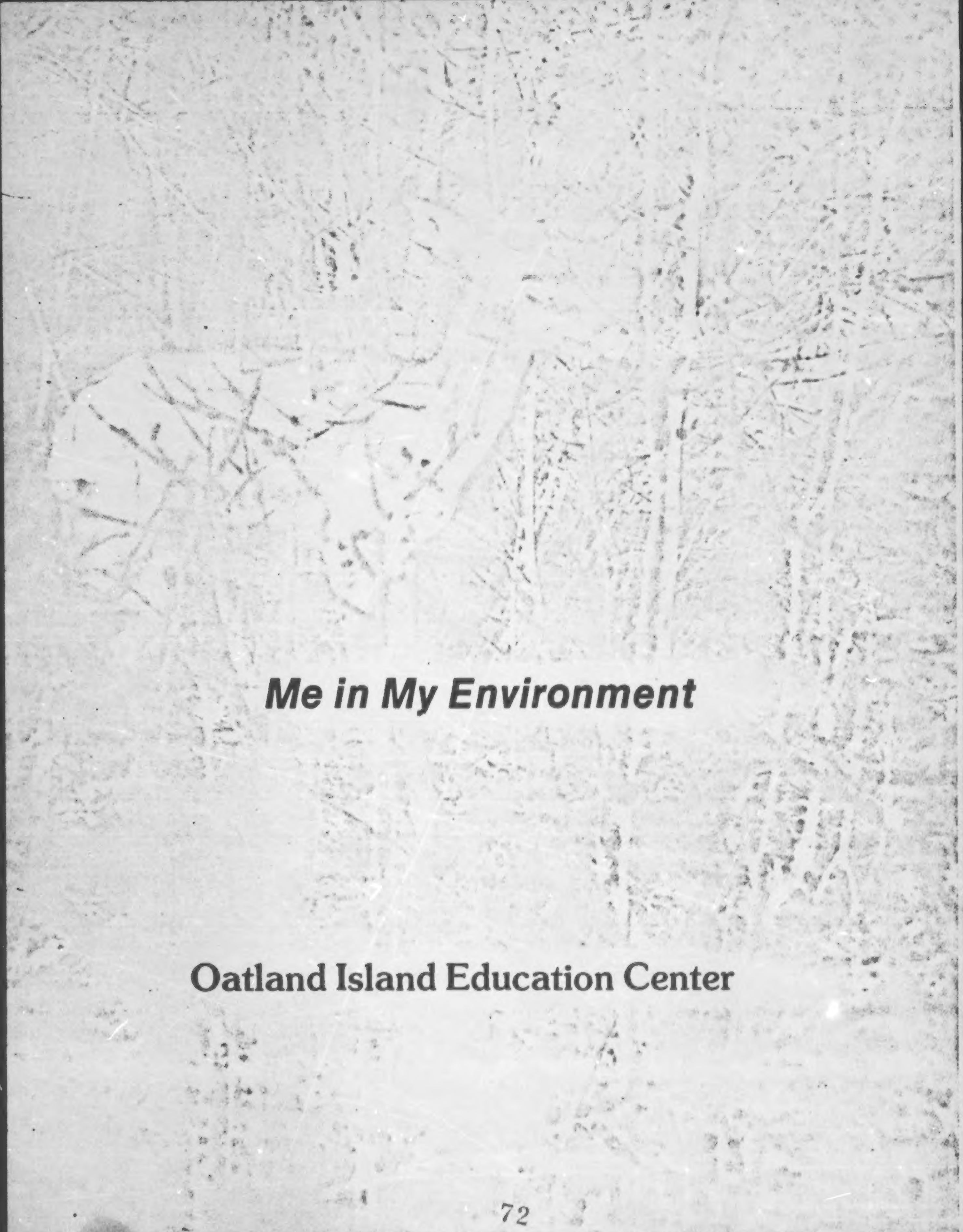
1. What the factory plans to do about the pollution?
2. What abatement measures have been taken?

MATERIALS:

1. Camera
2. Film
3. Paper and pen

REFERENCE:

1. Stop It; Sanders, Norman.
2. Pollution and Public Policy; Denhardt, Robert.



Me in My Environment

Oatland Island Education Center

ME
IN
MY
ENVIRONMENT

BY

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INTRODUCTION:

This unit contains a number of environmentally-oriented activities. The majority of these have been developed for the use on the primary level. However, after the teacher has become acquainted with the various activities, he or she can easily adapt a majority of these for the use on the junior or senior high level.

It should be noted that because of the large number of activities, there might not be sufficent time for completing the entire unit.

Because of this, each teacher should very carefully select and present only those activities that will suit the needs of the individual class.

Accompanying each activity is a material list, procedurial steps for completion of the activity, and a statement of purpose, references, resource materials, films and filmstrips are listed in the bibliography.

GOALS:

When the activities contained in this packet has been completed. the students will be able to:

1. Name the different environmental settings that are found in the community.
2. Have an understanding of why there are different environmental settings in the community.
3. Compare and contrast different environmental settings in the community.
4. Discuss how these different settings effect their lives.
5. Name several different ways of protecting the environment.

PRE/POST TEST:

1. Define environment?
2. Is there more than one environmental setting in your community?
3. Describe a salt marsh.
4. Name and describe some plants and animals that inhabit a forest.
5. Name and describe some of the environmental settings in a residential area.
6. Name and describe some of the environmental settings found in an industrial area.
7. Name several ways that man can change his environment.
8. Name several people who protect the environment.

TOPIC: Map Study

PURPOSE:

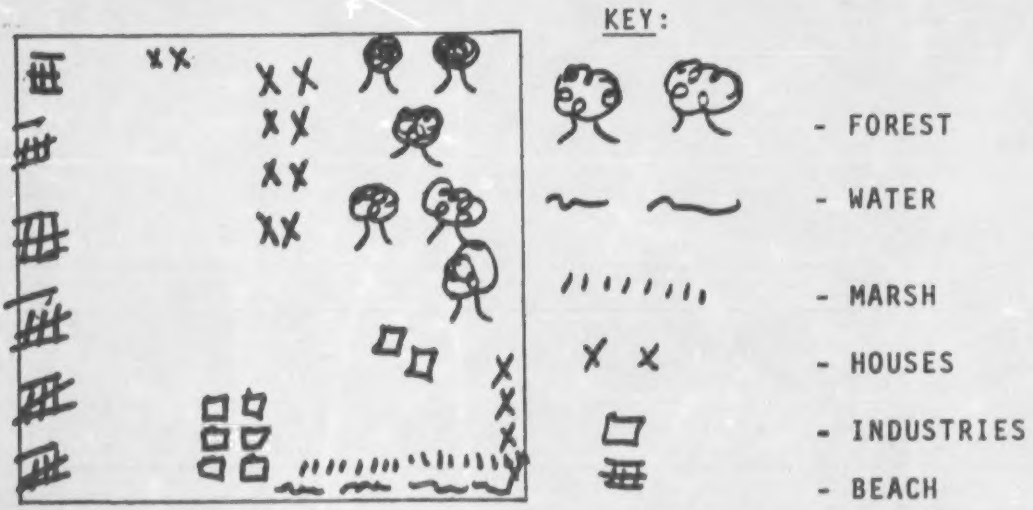
To demonstrate the many environmental settings found in the community, and to reinforce map skills.

MATERIALS:

1. Duplicated copies of a teacher-made map.
2. Crayons

PROCEDURE:

1. Draw a simplified version of a city or county map.



SAMPLE KEY

2. Give each student a copy of the map and six different colored crayons.
3. Discuss each symbol in the key:
   - a. What does each symbol represent?
   - b. See if you can find other symbols on the map that looks like the symbol in the key.
   - c. Color each symbol in the key a different color.

d. Color the symbols on the map to look like the symbols in the key.

4. After the students have completed the maps, present the following questions:

a. What is an environmental setting?

b. Is there more than one environmental setting in our community?

c. How many?

D. How do the environmental settings differ?

These maps can be used after any field trip to determine if students can locate areas on a map that are similiar to an area they have visited. Older students may be able to use commercial city and county maps rather than teacher produced maps.

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TOPIC: A Trip To The Marsh And Forest

PURPOSE:

To familiarize the students with the marsh and forest environments, to strengthen observation, discussion, and map skills.

MATERIALS:

1. Art paper
2. Crayons
3. County maps

PROCEDURE:

Schedule a field trip tc Oatland Island. Take the students on walks through the nature trails so they will see the forest environment. Take the class to the dock area to see the marsh. The Staff at Oatland Island will also show samples of the animal life found in the marsh. Upon returning to the classroom have the students refer to their city maps to locate the area they have just visited. Provide the students with crayons and paper so they can illustrate the environmental settings seen at Oatland Island. Collect the completed illustrations and review the field-trip.

Some aspects to consider would be:

1. What makes up a forest?
2. What makes up a marsh?
3. How are these two environments different?
4. How do these two environments compare with your neighborhood environment?
5. How could man harm the marsh?
6. How should man protect the natural environments?

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TOPIC: Field Trip To Residential And Industrial Areas

PURPOSE:

To compare two different environmental settings, to strengthen observation, and map skills.

MATERIALS:

1. Art paper
2. Crayons
3. City maps

PROCEDURE:

Schedule a field trip to a residential area. During the field-trip, ask the students to carefully compare the two areas.

After returning to the classroom, have the students refer to their county maps and locate the areas they visited. Following this, have the students illustrate the environmental settings of both areas. Once the illustration have been completed, have the students review and discuss the observations made while on the field trip.

Some aspects to consider would be:

1. Were there differences in the two areas visited?
2. What are some reasons for the differences?
3. Which area would you prefer to live in? Why?
4. Has man changed the environment of the industrial area?
5. Could either of these areas visited today be harmful to the community? How? Can this be controlled? How?

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TOPIC: A Day At The Beach

PURPOSE:

To familiarize the students with a beach environment, to reinforce observation, discussion, and map skills.

MATERIALS:

1. Art Paper
2. Crayons
3. County Maps

PROCEDURE:

Schedule a field trip to Savannah Beach. Have the students walk along the sea shore and observe the various components of the beach environment. (If desired, have the students collect marine specimens for future identification). After completing the beach walk, take the class to a residential area of the beach for comparative observations.

Upon returing to the classroom, have the students complete separate illustrations depicting the environment settings. After the illustrations have been completed, review the field-trip.

Some aspects to consider would be:

1. What makes up a beach environment?
2. Why are there houses and stores in this setting?
3. How is the beach environment different from the marsh?
4. What steps should be taken to protect the beach environment?

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TOPIC: Let's Visit Savannah

PURPOSE:

1. To develop an awareness of the various aspects of a community.

MATERIALS:

1. Transportation to Savannah Visitors Center.

PROCEDURE:

Say to the class "Today we are going to pretend that we have never been to Savannah before. We are going to the Visitors

Center to see a film and to learn about the many interesting places in this community." After the trip, let each student discuss his favorite landmark, also, discuss the reasons why he would like to move to Savannah.

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TOPIC: Why Do I Live Here?

PURPOSE:

To demonstrate how the environment affects our lives.

MATERIALS:

1. Map of Georgia

PROCEDURE:

Have the students locate their community on a map of Georgia.

Present the following:

Suppose your family lived in an area far away from where you live now. Try to think of reasons why your family would want to move to Savannah. What does this community have to offer your family in terms of work, housing, stores, public services, and recreation? After the student have thought about the problem, have them record the things that would benefit their family and would be reasons for the family to move to this community. The teacher should compile the reasons listed and duplicate them so every student would have a copy. Provide time for the students to share their choices and defend reasons.

TOPIC: A New Neighborhood

PURPOSE:

To evaluate the students understanding of what makes a neighborhood.

MATERIALS:

1. Magazines
2. Glue
3. Scissors
4. Manila paper

PROCEDURE:

Have students cut out various pictures of building, businesses, trees, shrubbery, people, etc., and have them paste these on manila paper to develop a picture of a new neighborhood.

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TOPIC: The City

PURPOSE:

To provide motivation for studying the city as a joint working and sharing project. To promote awareness of the physical make up of the city.

MATERIALS:

1. Drawing Paper
2. Crayons
3. Patterns of geometric forms: Circle, square, rectangle, triangle and half circle.

PROCEDURE:

Say to the students, "The City is made up of many buildings.

Think of the downtown district. How are the buildings different from those in a residential area? How do they differ from the farm? Instruct the students to use the geometric shapes to make buildings that resemble the downtown area. The students might need to take a field trip to observe the actual buildings. They will also have to try many different combinations of the patterns before they will be satisfied with their buildings. After each student is finished, make sure he/she can identify each shape individually.

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TOPIC: Places In Our Community

PURPOSE:

To determine the different aspects of the Community.

MATERIALS:

1. Pencils
2. Crayons
3. Newsprint
4. List of places in our community.

PROCEDURE:

Present the following list to the students:

1. Places for Fun.
2. Places to Learn.
3. Places for Safety.
4. Places for Communication.
5. Places for Transportation.
6. Places to learn about Nature.

The students should copy these headings on paper then list specific places where these things occur in their community. If the student wishes, he could draw a picture to illustrate each place.

EXAMPLE: Places for Fun - Parks, Beaches, Rivers.

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TOPIC: Our School Neighborhood

PURPOSE:

To reinforce knowledge of the school neighborhood.

MATERIALS:

1. Milk cartons of all sizes.
2. Cardboard boxes.
3. Paint
4. Sawdust
5. Stones
6. Twigs
7. Cardboard
8. Construction paper
9. Wall paper
10. Scraps of carpeting.
11. Glue

PROCEDURE:

Take the class on a walk around the school neighborhood and discuss the types of buildings, homes, and other landmarks. Then turn the classroom into an "Architectural Studio." Draw three blocks on the floor or on top of tables for three groups of students. Instruct each group to represent a block close to their school environment. Be sure to stress detail. Milk cartons are excellent for houses, sawdust can be used to represent the ground.

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TOPIC: Make A Map

PURPOSE:

Orienting ones direction, learning to make maps.

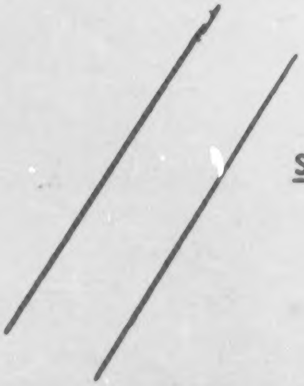
Learning names of cardinal directions.

MATERIALS:

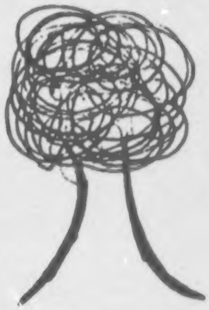
1. Paper
2. Pencils

PROCEDURE:

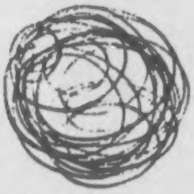
The students will make a map showing his home, his immediate neighbors houses, the street, trees and shrubbery. He will mark the neighbors houses to cardinal directions and the streets, trees and shrubbery with predetermined symbols.



STREETS



TREES



SHRUBBERY

TOPIC: Learning Directions In The City

PURPOSE:

Learning Cardinal Directions

MATERIALS:

1. Large map of city covered with a sheet of plastic.
2. Colored wax marking pencils.

PROCEDURE:

Using the school as a starting point, have each student use a marking pencil to trace the route he would follow to get to a specific place. Students would then discuss directions taken whether or not it was the shortest or most desirable route.

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TOPIC: A Stroll Around The Block

PURPOSE:

To acquaint student with seasonal changes in the environment.

MATERIALS:

1. Paper and pencil.
2. Crayons
3. Art paper

PROCEDURE:

Explain to the students that it is fun to take walks in all seasons, and that at different times of the year you can look for different things. Have each student write stories and/or draw pictures showing what they would see during their environment in each of the four seasons.

TOPIC: What Would You Do?

PURPOSE:

To demonstrate how man can alter the environment.

MATERIALS:

1. Paper
2. Pencil
3. Paints or crayons

PROCEDURE:

Have the students select a situation from the list below, you may want to add to the list and draw or write his solution to the problem.

1. What would you do if you found an alligator on the street?
2. What would you do if you were told that a road was to be built through your house?
3. What would you do if the marsh near your house was going to be filled?
4. What would you do if an industry wanted to locate next to your house?
5. What would you do if Fort Pulaski was to be turned into a parking lot?

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TOPIC: My Community Has Changed

PURPOSE:

To show how man has changed his environment.

MATERIALS:

1. Pictures of Savannah in it's early years and pictures showing

the community as it is today (these can be obtained at the Public Library, Chamber of Commerce, Historic Savannah).

2. Chart
3. Paper
4. Pencils

PROCEDURE:

Divide the class into small groups. Provide each group with a picture of the community in its early years and a picture of the community as it is today. Have the students study the pictures. Ask the class to look for things that are different and alike in the pictures. Give each group a sheet of chart paper. Paste the pictures on paper and divide it into two columns, label one section "Similiarities and the other Differences". Students are to list the similiarities and differences between the two pictures on the chart. After the chart have been completed, have the students discuss the charts.

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TOPIC: The Old And New In Our Country

PURPOSE:

To demonstrate how man has changed his environment.

MATERIALS:

1. Paper
2. Pencils
3. Art paper
4. Crayons

PROCEDURE:

Take the students on a field trip to a section of town away from their own neighborhood. Ask the students to look for buildings, objects, or landmarks that have been a part of the environment for a long time. Also ask the students to notice changes and new additions to this environment. When you return to the classroom, provide the students with two sheets of art paper, ask them to draw a picture of one old thing and a picture of one new thing in the area just visited. After the drawings are finished, have the students write a a story about each picture. List on the blackboard these guidelines for the stories.

Old Building:

1. Where was it located?
2. Why is it here?
3. What is it's condition?
4. What is it's purpose?
5. What is the condition of the environment around the building?
6. Why is it in this condition? Could it be improved? How?

New Building:

1. Why was this building placed where it is?
2. What is it's purpose?
3. What effect will this structure have on the surrounding area?

TOPIC: Yesterday's Environment

PURPOSE:

To demonstrate how the environment can be changed.

MATERIALS:

1. Paper
2. Pencil
3. Materials to make booklets.

PROCEDURE:

The students will be instructed to interview older citizens in the community (grandparents, neighbors) and question these people about changes they think helped the environment, and which changes they think harmed the environment. The student interviews could be combined and made into a booklet.

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TOPIC: GOOD-BYE FOREST

PURPOSE:

To demonstrate how man can change his environment.

MATERIALS:

1. Cardboard boxes
2. Dirt
3. Gravel
4. Toy houses
5. Cars
6. Stores
7. Construction paper trees.

8. Grass and bushes.

PROCEDURE:

Divide the class into groups. Provide each group with a cardboard box, dirt, and construction paper trees, grass and bushes. Have each group "build" a forest in their box. After the forests are completed, distribute the gravel, houses, stores, and cars. Have the students build a residential area in the box that the forests are in. Remind the students that they will have to remove part or all their forest to construct streets and buildings. After the students have finished the residential areas, discuss what happened to the forest that was there before the streets and buildings were put in.

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TOPIC: What's My Line?

PURPOSE:

To acquaint students with persons who help control the environment.

MATERIALS:

Pictures of people in our community whose jobs relate to the environment. These may be drawn by the students or cut out of magazines or journals.

PROCEDURE:

Say to the students. "Can anyone tell us how "What's My Line" is played? After discussing directions, show the students pictures of community helpers. Hold each picture up and allow the student to ask one question that the teacher can answer with yes or no. Instruct the students to raise their hand when they can identify the person and tell one fact about them. Some examples of workers in the environment are garbage men, fire men, game warden, life guard, policemen, forest ranger, city planner.

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TOPIC: **Weekly Diary**

PURPOSE:

To observe the environment and recording experiences.

MATERIALS:

1. Paper
2. Pencil

PROCEDURE:

Instruct each student to maintain a diary for a period of one week. In the diary the students should include all the places visited, what was seen, and impressions of their environment.

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TOPIC: **The Web Of Life**

PURPOSE:

To illustrate how plants and animals are dependent upon each other and upon the environment.

MATERIALS:

1. Ball of string

2. Magic marker
3. Name cards

PROCEDURE:

Have the students form a circle and give each a name card which identifies he/she as some part of the environment such as sun, air, water, soil, a plant, an animal. The participants should keep their cards face down until the web is made.

The leader unwinds the string from player to player, criscrossing back and forth across the circle. When each player is connected the leader begins by turning over his card and explaining why his connection with the next person is important. After all the participants have explained their importance in the web, the leader lets his end of the string go, resulting in an unraveled web. A discussion should follow concerning the interrelatedness of all things in the web.

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TOPIC: Cross The Creek

PURPOSE:

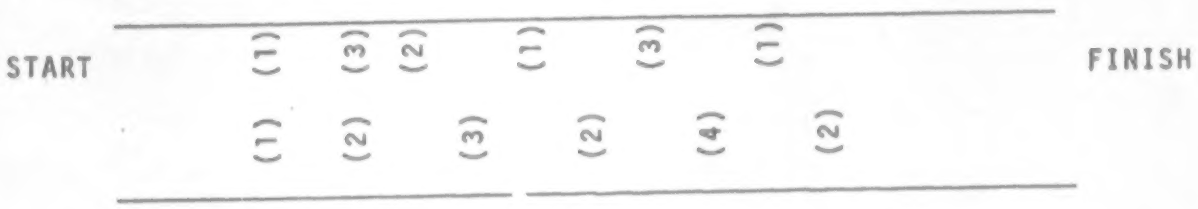
To identify elements belonging to a specific environment - The Marsh.

MATERIALS:

1. Poster board with a river drawn on it.
2. Numbered stepping stones with environmental components written on the bottom.

PROCEDURE:

In this game, the student must cross the creek by stepping on stones, by following the numbers from one, two, three, and so on. Each stone has an environmental element that may not be related to the marsh environment. The student must answer yes or no and then check his answer before preceeding to cross the creek. If he misses, he will have to start over on another path.



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TOPIC: Litter Trip

PURPOSE:

To become aware of one cause of pollution.

MATERIALS:

1. Paper bags
2. Paper and pencil

PROCEDURE:

Take students on a walk around the school and/or neighborhood. Give each student a paper bag and have him/her fill it with litter picked up on the walk. When the students return to class, have then empty all of the bags on a large table to examine and classify the contents. Discuss the items found, where they were found, who was guilty of dropping the litter, and what could be done to solve the litter problem. An anti-litter bulletin board can be designed by using the litter that was collected.

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TOPIC: Pollution Solution

PURPOSE:

To become aware of steps being taken to solve pollution problems.

MATERIALS:

1. Duplicate copies of Work-sheets.

PROCEDURE:

The students will be given a worksheet with the following instructions and questions:

Use an encyclopedia or a resource book to help answer the following sentences.

1. Environmental pollution is ______________________.
2. Four kinds of pollution are ______________, ______________, ______________, ______________.
3. Air pollution can cause ______________________.
4. Water pollution can cause ______________________.
5. The development of technology has caused pollution by ______________________.
6. Our economy has caused pollution by ______________________.
7. Convenience or Social pollution is caused by ______________________.
8. Four ways man is trying to control pollution are ______________, ______________, ______________, ______________.

9. Environmental Protection Agency is ______________________________.

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TOPIC: Grocery Store Waste

PURPOSE:

To become aware of the various kinds of packaging waste.

MATERIALS:

1. Teacher-made forms
2. Pencils
3. Magazines

PROCEDURE:

From magazines, collect a variety of packaged grocery products. Have students look at pictures and decide which products have excess packaging that would contribute to waste problems. Let students decide how these products could be sold to lessen the amount of excess packaging.

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TOPIC: Inventions - Harmless or Harmful?

PURPOSE:

To demonstrate many kinds of pollution.

MATERIALS:

1. Teacher-made forms
2. Paper and crayons.

INVENTION	Why is it harmful or harmless as a Pollution Source
1. ______________________________	1. ______________________________
2. ______________________________	2. ______________________________

Have the students invent a machine that will help solve pollution problems. Draw a picture of the invention, and color it.

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TOPIC: Environmental Guessing Game

PURPOSE:

To demonstrate the many environmental settings in a community.

MATERIALS:

Cards with the following environmental descriptions.

1. In my environment, I have fish, shrimp, crabs.
2. In my environment, I have sand, shells, sea gulls.
3. In my environment, I have stores, tall buildings, cars.
4. In my environment, I have houses, sidewalks, children.
5. In my environment, I have marsh grass, snails, oysters.
6. In my environment, I have waves, sea oats, lifeguards.
7. In my environment, I have large trucks, many people, train tracks.
8. In my environment, I have tall trees, moss, rocks.
9. In my environment, I have parks, toys, small stores.
10. In my environment, I have raccons, foxes, bears.

PROCEDURE:

Divide the class into groups and give each group a set of cards. Have the students select a student to read his description and let the others try to guess what setting he is talking about. The student who guesses correctly gets to read his card. The game is over when all of the cards have been read.

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TOPIC: Make Believe Neighborhood

PURPOSE:

To evaluate the students understanding of what makes up a neighborhood.

MATERIALS:

1. Paper
2. Crayons
3. Pencils

PROCEDURE:

Have each student write up a make-believe neighborhood, describing businesses and buildings that are there. Give the students a list of other businesses or buildings and let them respond as to whether or not they would fit into the make-believe neighborhood. Let each student illustrate one of the make-believe neighborhoods.

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FILMS:

Marine Life (#584)

Depicts some of the colorful forms of animal life found under the sea. Shows typical activities of a variety of marine organisms in their natural surroundings. (11 minutes)

FOREST BABIES (#910)

Presents a variety of forest babies, including a fawn, bear cubs, coyote pups, pheasent chicks, raccoons, mink, opossum, wood chucks, skunks, bunnies, and ducklings. Show how these babies learn and grow quickly. (11 minutes)

FORESTRY (#4655)

Shows many ways the forests of the world are being used. Features lumber for construction, wood pulp for plywood and paper, and rubber, cacao, and quinine for a variety of purposes. Emphasizes conservation for future generations. (20 min.)

FORESTS AND CONSERVATIONS (#645):

Presents a study of the critical problems of how to conserve and efficiently utilize our forest resources. Show correct logging, proper cutting methods, reforestation, and fire-fighting methods. (10 min.)

THE INDUSTRIAL CITY (#5316)

Presents a case study to Detroit with a review of its growth and the people responsible for it. Focuses on problems of congestion, pollution, and crime. (17 min.)

BEACH AND SEA ANIMALS (#273)

Illustrates and explains the characteristics and importance of invertebrate animals living on or near the beach. Shows the body plan, adaptations, and interrelationships of a wide variety of beach and sea animals. Demonstrates basic concepts of marine life through close-up underwater photography. (11 min,)

THE BEACH: A RIVER OF SAND (#4543)

Analyzes currents produced by waves and calculates the accumulation and depletion of sand and show that the most pronounced movement of sand on a beach is usually along the shore.

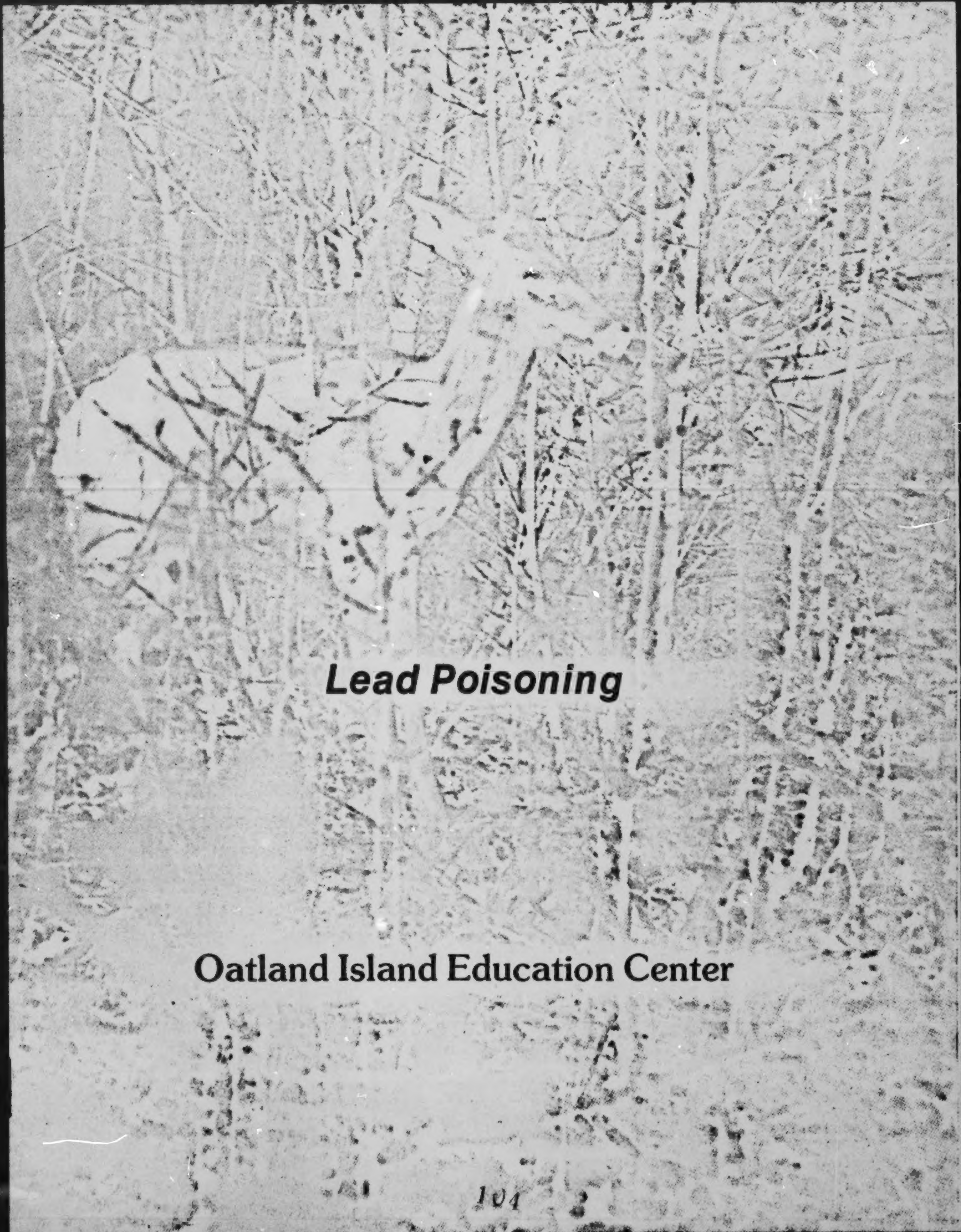
Says that a beach is actually a moving river of sand between the land and the water. (20 min.)

BIRDS OF THE MARSHES (#151)

Documents the lives of the red-winged blackbird, yellow throated warbler, least bitten, Virginia Rail, Purple Gallinule in their natural habitat. (11 min.)

NEIGHBORHOODS ARE DIFFERENT (#396)

Compare ways of living in different types of neighborhoods: a farm, a small town, a big city, and in a suburb. Shows that each kind of neighborhood has some things that others do not, and that the children of each neighborhood have different things to see and do. (11 min.)



Lead Poisoning

Oatland Island Education Center

LEAD POISONING:
A HEALTH PROBLEM IN SAVANNAH

BY
PEGGY S. ALDER

INTRODUCTION:

Lead Poisoning is a growing concern in Savannah as well as in other urban areas of the United States. The critical ages for contracting lead poisoning are from one to six. The results can be devastating for a child who contracts lead poisoning including mental retardation, cerebral palsy, blindness, kidney diseases, convulsive disorders, learning and behavorial difficulties, and death.

There are many myths associated with lead poisoning. One is that the only way to contact lead poisoning is through the ingestion of paint chips which have a high lead content. Although this is true in the majority of identified lead poisoning cases, there are other sources of lead poisoning. Inhaling or eating materials that contain fumes from leaded gasoline or chewing on printed media that has lead in its ink are also ways of contracting lead poisoning.

Another myth about lead poisoning is that it is limited to ghetto children. As stated previously, the major source of lead poisoning is through the ingestion of paint chips containing high lead content. Prior to 1950, most paints were at least 50% lead based and therefore homes over 30 years old are more likely to have this source of lead poisoning. The highest concentration of homes over 30 years old are in the inner city. For this reason, the percentage of ghetto children with identified cases of lead poisoning is much higher than the percentage of cases in suburban children. This by no means limits the problem to the ghetto area as there are many homes over 30 years old in areas other than the inner city. Lead based paint may also be found in some oriental figurines, old toys, some pencils as well as in ink of some printed media.

One of the major problems in dealing with lead poisoning is diagnosing its symptoms. The symptoms of lead poisoning are listleness, lost of appetite, constipation, stomach cramps, and vomiting. Unfortunately, these are also symptoms of other illnesses so they may be mistaken, even by a physician. Another problem is that a child may have symptoms which are entirely different (hyper-activity instead of listleness, (for example), if no symptoms at all until the lead is dangerously high. The only sure way to test for lead poisoning is through a blood test which should be given to children of critical ages periodically. Even after it has been diagnosed and treated, the source of the lead poisoning must be located and removed.

Lead poisoning is a widespread hazard that many people of all classes are unaware of. The purposes of these exercises is to explore the sources, symptoms, treatments, effects of lead poisoning, and the extent of the problem in the Savannah area.

PERFORMANCE OBJECTIVES:

At the end of these exercises, the student will be able to:

1. List five sources that can cause Lead Poisoning of children.
2. Identify major physical, mental, and behavorial problems resulting from lead poisoning.
3. State four major symptoms of lead poisoning.
4. Demonstrate how paint can be tested for lead content.
5. Describe five major steps in treating lead poisoning.
6. Estimate location of target areas for lead poisoning screening in Savannah.
7. Plot graph showing levels of lead contained in tested printed media.

I. MATERIALS:

A. Articles and Pamphlets:

1. Chisolm, Julian, M.D., "Lead: Question and Answer Guide for Parents," Mothers Manual, May-June 1976, pp. 37-38. (East District Lead Poisoning Agency).
2. Chisolm, Harriet and Sallie Frenkel, "Children and Lead Poisoning," American of Nursing, Volume 75, January 1975, pp. 102-104. (Memorial Medical Center Library).
3. Graham, Ada and Frank Graham, "Lead Poisoning and the Suburban Child," Todays Health, March 1974, pp. 38-41. (Savannah Public Library).
4. "Increased Lead Absorption and Lead Poisoning in Young Children," A Statement by the Center for Disease Control, United States Department of Health, Education and Welfare, March 1975. (East District Lead Poisoning Agency)
5. Magos, L, M.D., "Lead, Mercury and Cadmium Pollution", Nursing Mirror, January 22, 1976, pp. 47-49. (Memorial Medical Center Library)
6. Joselow, Morris M., "Lead Content of Printed Media (Warning: Spitballs May be Hazardous to Your Health," American Journal of Public Health, March 1974, pp. 238-240. (Memorial Medical Center Library)
7. Medical Aspects of Childhood Lead Poisoning," HSMHA Health Reports, February 1971, pp. 140-143, (East District Lead Poisoning Agency)

B. FILM MATERIALS:

1. "Lead Poisoning: The Hidden Epidemic," (East District Lead Poisoning Agency)
2. "Lead Poisoning in Savannah," a slide presentation provided by the East District Lead Poisoning Agency.

C. RESOURCE PERSONS:

1. Brown, Sylvester or Ann Sigur, Health Inspectors, East District Lead Poisoning Agency.
2. Knight, Kathleen or Ann Trotman, Nurses for the East District Lead Poisoning Agency.
3. Walsh, Thomas F., Director of the East District Lead Poisoning Agency.

D. MISCELLANEOUS MATERIALS:

1. Graph Paper
2. Poster Paper
3. Magic Markers
4. Eye Droppers
5. Sodium Sulfide Solution
6. Paint Chips (Leaded and Regular)

* Arrangements must be made in advance for these materials.

** Provided by the East District Lead Poisoning Agency.

II. Sources of Lead Poisoning

A. As an introduction to this unit, have the students view the film, "Lead Poisoning: The Hidden Epidemic".

Present the following questions:

1. How many children contract lead poisoning per year?
2. What is the emergency treatment for lead poisoning?
3. What are some of the results of lead poisoning?
4. Name some of the sources of lead poisoning that were given in the film?

5. Why is it hard to detect lead poisoning?
6. What are some things parents can do to prevent lead poisoning?

B. Have the students read the following articles:

1. "Increased Lead Absorption and Lead Poisoning in Young Children."
2. "Lead Poisoning and the Suburban Child."
3. "Lead: Questions and Answer Guide for Parents."
4. "Lead, Mercury and Cadmium Pollution."

Each of these articles contain some of these sources so divide the class into 4 groups (to cut down on copies you reproduce) and have each group examine one of the articles. When they have finished, bring the group back together for a general discussion. List the sources found in each of the articles on the board. It might be a good idea to have someone transfer these sources to poster board so they can be displayed during the unit.

C. Have students read the article, "Lead Content Printed Media (Warning: Spitballs May Be Hazardous to Your Health)" and have them use one of the three tables in the articles to plot a Bar Graph or a Broken-Line Graph showing the information given in the article.

III. Symptoms, Diagnosis, Treatment and Prevention of Lead Poisoning.

A. Have students research the articles, "Lead: Question and Answer Guide for Parents," "Lead Poisoning and the Suburban Child" and compile a listing of the symptoms of Lead Poisoning. Transfer this information on to a poster.

B. Invite a nurse from the East District Lead Poisoning Agency to the class to demonstrate the test for diagnosing Lead Poisoning. Have the students make up a list of questions to ask her before she comes. (She can also give them information on treatment and result of Lead Poisoning).

C. Have the students research the articles, "Increased Lead Absorption and Lead Poisoning in Young Children," and "Children and Lead Poisoning" for information on the treatment of Lead Poisoning..

D. With the information learned, have the students design a program on ways of preventing Lead Poisoning. Some of the items that might be included are:

1. Sweep any peeling paint off walls, woodwork and ceiling with a stiff brush or broom. Then, be sure to throw all loose pieces away.
2. Keep looking for new paint chips and peeling paint. Keep lower parts of walls free from peeling paint.
3. Don't let children chew on woodwork, stair railings, or other places which have been painted--even if the paint isn't flaking.
4. Have the older children in the family and other friends and relatives keep a watch on young children and keep them from eating paint.

VI. Lead Poisoning in Savannah.

A. Have the students view the slide presentation from the East District Lead Poisoning Agency. Hold a class discussion afterwards and present the following questions:

1. What are some of the places where lead poisoning can be contracted?
2. How many Savannah children are lead poison each year?
3. What are the critical ages for contracting lead poisoning?
4. How much paint with a high lead content must a child eat before being lead poison?
5. What is pica?
6. What are some of the target areas for lead poisoning screening in Savannah?

B. Have a Health Inspector bring a paint testing machine to class for a demonstration. While he is there have the students perform their own experiment for lead content in paint. They can do this by filling an eye dropper with the sodium sulfide and dropping it on a paint chip. Have them perform the experiment on 2 chips, one with high lead content and one with low lead content and compare their results.

C. Invite Thomas F. Walsh, Director of the East District Lead Poisoning Agency, to the class to discuss the lead poisoning problem in Savannah. Let the students make lists of questions to ask before he comes.

EXTENDED ACTIVITIES

1. Have some of the students go out with the Health Inspector to investigate a home for high lead content.
2. Have the students draw diagrams of possible "leaded" hazards in their own homes.
3. Have the students give a presentation in assembly on the dangers of lead poisoning.

PRE-TEST

TRUE or FALSE

1._____ Approximately 19% of the children tested for lead poisoning in Savannah have shown elevated lead levels in blood.

2._____ Pica is a type of lead based paint.

3._____ A child must inject at least 1/2 ounce of high lead content paint a day for a long period of time to contract lead poisoning.

4._____ Children under 6 years old are in little danger of contracting lead poisoning.

5._____ The best way to prevent lead poisoning is to cover walls in older homes, where there are children.

Circle the best answer.

6. Possible sources of lead poisoning are: (1) lead based paint, (2) gas fumes, (3) Canned Milk, (4) eye cosmetics.

   (a) I & III

   (b) III & IV

   (c) I, II & IV

   (d) All of the above

7. The major treatment for lead poisoning is

   (a) Pica Therapy

   (b) Sulfa Drugs

   (c) Chelation Therapy

   (d) Pennicillin

8. Some of the diseases which may be result of lead poisoning are: (1) Mental retardation, (2) Cancer, (3) Kidney diseases, (4) Cerebral Palsy, (5) Heart murmur
   - (a) I, III & IV
   - (b) II, III & V
   - (c) I, III & IV
   - (d) All of the above
9. The printed media which would be more likely to have a higher lead content than the others is:
   - (a) Newspaper
   - (b) Comic Books
   - (c) Magazines
   - (d) Books without pictures
10. The symptoms for lead poisoning can be most easily confused with the symptoms of:
    - (a) Influenza
    - (b) Stomach Virus
    - (c) Ear Infection
    - (d) Pneumonia

POST-TEST

Circle the best answer.

1. Some of the diseases which may be the result of lead poisoning are: (1) Cancer, (2) Mental Retardation, (3) Cerebral Palsy, (4) Kidney Disease (5) Heart Murmur
   - (a) I, II & V
   - (b) II, III & IV
   - (c) I, III & IV
   - (d) All of the above.
2. The symptoms for lead poisoning may be most easily confused with the symptoms of:
   - (a) Stomach Virus
   - (b) Pneumonia
   - (c) Influenza
   - (d) Ear Infection
3. Possible sources of lead poisoning are: (1) Canned Milk, (2) Gas Fumes, (3) Eye Cosmetics, (4) Lead Based Paint.
   - (a) I & II
   - (b) III & IV
   - (c) II, III & IV
   - (d) All of the above.
4. The printed media which would be more likely to have a higher content of lead than the others is:
   - (a) Books without pictures
   - (b) Comic Books

(c) Magazines

(d) Newspapers

5. The major treatment for lead poisoning is:

(a) Chelation Therapy

(b) Pica Therapy

(c) Pennicillin

(d) Sulfa Drugs

Answer the following with True (T) or False (F)

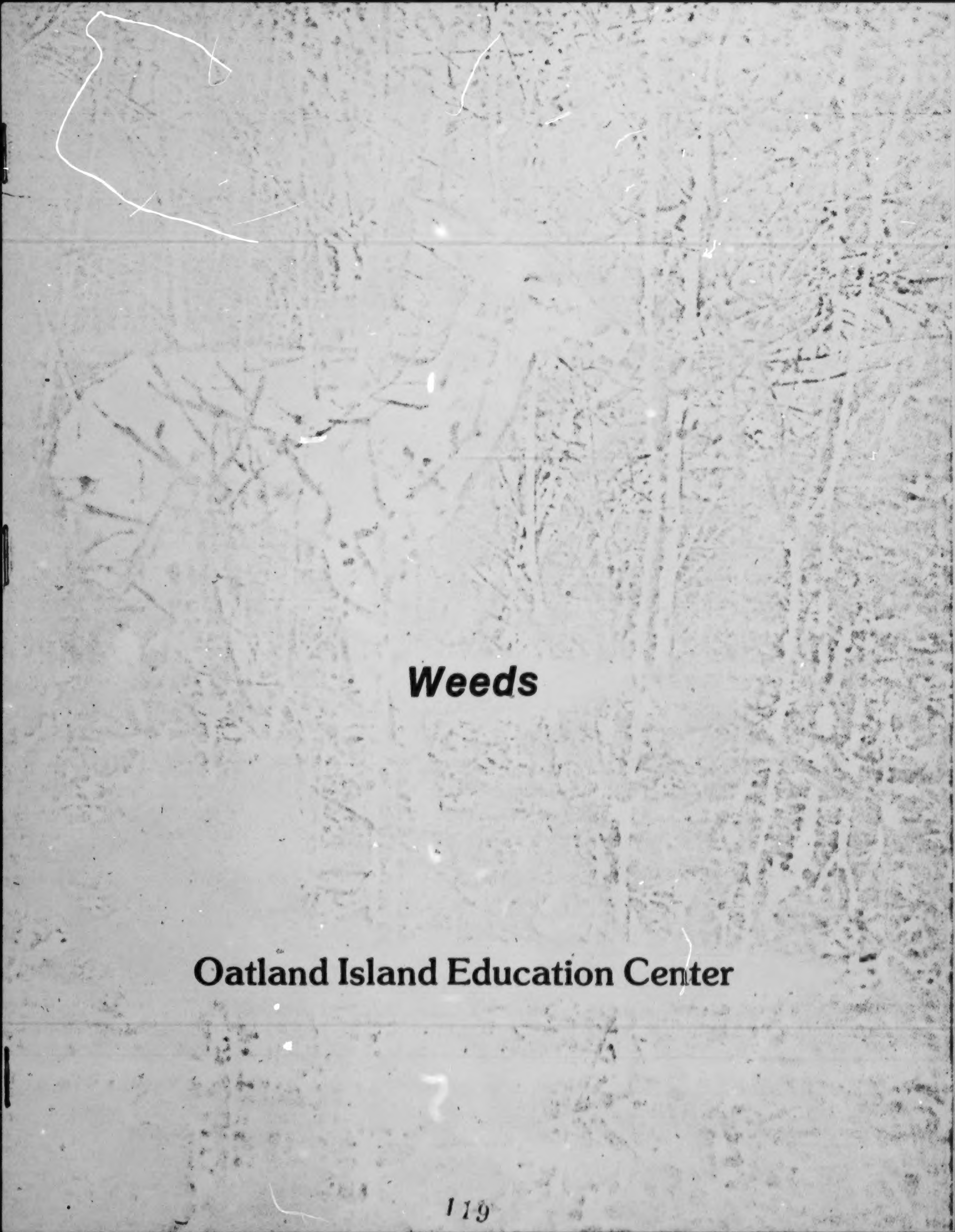
1.____ The best way to prevent lead poisoning is to repaint walls.

2.____ At least 50% of the children tested in Savannah for lead poisoning have shown elevated blood lead levels.

3.____ The critical age for lead poisoning in children is from one to six years.

4.____ Pica is the desire certain children have for eating non-edible items.

5.____ Children must inject great amounts of leaded paint chips everyday to become lead poisoned.



Weeds

Oatland Island Education Center

WEEDS

DANDELION

GOLDENROD

RAGWEED

CRABGRASS

By

Cindy Smith

INTRODUCTION:

What is a weed? Why is one plant called a weed while another is cultivated as a desirable plant? These are questions that will be answered by completing the following activities and the expansion activities.

Basically, a weed is a plant that is growing where it is not wanted. The plants of waste places are also called weeds. Most weeds grow on land, but there are some varieties that can grow in water. Weeds can be both harmful and helpful to man. Weeds such as wild garlic will ruin the milk cows even if the cows even sniff the weed. Weeds such as foxglove and catnip, however, are used to make medicines. Weeds such as chicory, dandelion, and spearmint can be eaten.

The purpose of the activities are to introduce students to weeds and help them to understand why weeds are so plentiful.

OBJECTIVES:

At the end of the excerise, the students should be able to:

1. Define weed.
2. Identify several varieties of local weeds.
3. Explain why some weeds are able to spread great distances.
4. Describe the root systems of a typical weed.
5. List several ways in which weeds deprive other plants of nutrients and minerals.
6. Explain why it is difficult to eliminate some weeds by trying to pull them up.
7. Describe some basic leaf shapes.

8. Estimate the number of seeds produced by some varieties of weeds.
9. Describe the stem of weeds.
10. Classify weeds according to those that flower and those that do not.

****

ACTIVITY I: **Introduction to Weeds**

BACKGROUND:

In this activity the students will study weeds. They will examine weeds in the class and in the field and come to some conclusion about why weeds are plentiful and why they are hard to eradicate.

MATERIALS:

Samples of different weeds commonly found in our area or clear illustrations of these weeds, including the roots.

A: Ask the students to write what they consider a weed to be, and why they think weeds are so plentiful.

B: Let the students examine some of the weeds. Have them answer the following questions.

1. What is a leaf shape?
2. Do the leaves extend upward, or do they grow flat?
3. What advantage would a weed have for survival if its leaves grow flat?
4. What type of root-system do weeds have?
5. Do roots give the weeds an advantage for survival?

ACTIVITY 2: **Field Investigation**

MATERIALS:

1.	Shovel	5.	Paper
2.	Trowel	6.	Magnifying glass
3.	Collecting box	7.	Meterstick
4.	Pencil		

PROCEDURE:

Visit a field in which weeds are plentiful. Divide students into groups and have each group measure a square meter in the field. Each group should complete the following.

1. Count the weeds found in the square meter.
2. Name the different weeds found.
3. Try to pull a weed by hand. Do the roots come up with the plant? If they do not, would the weed be eliminated? Why or why not?
4. Determine if any weeds are producing seeds? If they are, study the seeds. (A magnifying glass is needed here.) Does the way the seeds are positioned give a clue as to why the weed might easily spread? Count the seeds on the stem and multiply it by the number of stems. Estimate the number of seeds each plant has.
5. Examine the leaves. Do they extend upward, or are they close to the ground? If they are close to the ground, how much sun will they recieve? What happens to the grass that might be under the leaves.
6. Dig up a weed with the shovel or trowel observe the root system. Determine why the roots didn't come up when the weed was pulled by hand.
7. Measure the height of different varieties of weeds.

8. Examine the stems of some weeds. Look to see if there are thorns present. How could this prevent man from eliminating the weed?

****

ACTIVITY 3: Data Analysis

Upon returning to class have the students discuss their findings. In drawing conclusions, have the following questions answered.

1. From the observation of the plant roots, do weeds get more than their share of water?
2. How do the weeds rob other vegetation of their share of sunlight?
3. List reasons why weeds are undesirable. The reasons should come from the observations made during the study.

EXPANSION ACTIVITIES:

1. Research the origin of a weed. This could be done in two ways.

A: The students could investigate the natural origin and find which weeds resemble plants from the early history of our earth.

B: The students could investigate the weeds that have been imported to America.

2. Research the names of weeds. For example the name dandelion is French in origin, The French call it dent de lion or lion's tooth because its jagged edges resemble like a row of teeth. To the English this name sounded like dandelion.
3. Study poisonous plants and have students learn to recognize these plants.
4. Write poems or make up puns using the names of weeds: for example

dandelion might become a dandy lion or duckweeds might read "A duck weed".

5. Research the use of weeds in medicines. The leaves of foxglove are used to make the heart drug digitails.
6. Study weeds that can be eaten.
7. Study what effects weed have on crops and farm animals.

****

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The True Book of Weeds and Wild Flowers; Podendrof, Illa.

Weeds; Hogner, Dorothy, Childs.

The First Book of Weeds; Beck, Barbara L.

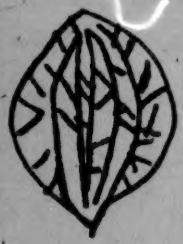
FILM:

Weeds and Mosaics

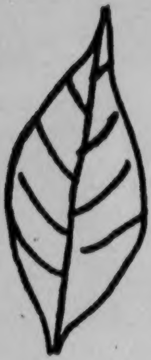
Georgia State Catalog (#1059)

This film shows students howto create mosaics using weeds as an inspiration. The film could be used as an art expansion activity.

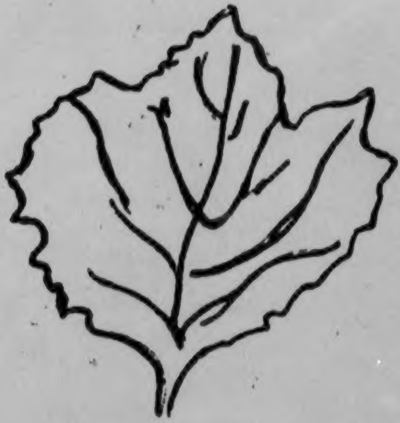
BASIC LEAF SHAPES



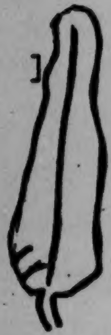
OVAL - SHAPED



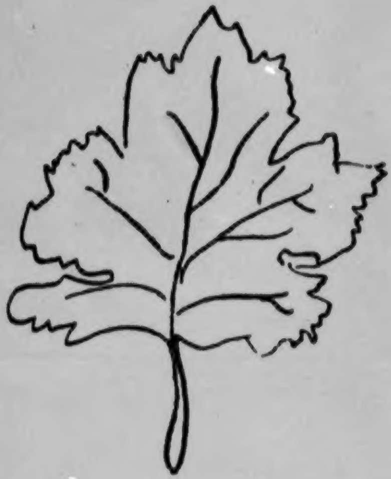
LANCE - SHAPED



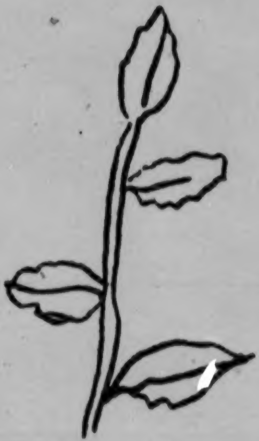
TOOTH - EDGED



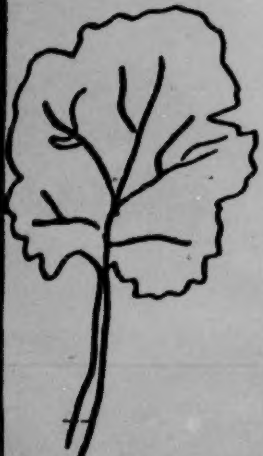
NARROW - OBLONG



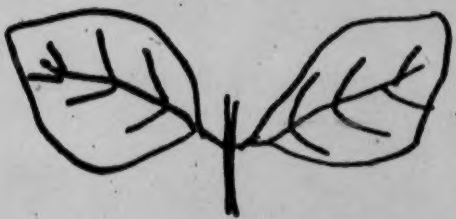
TOOTH - EDGED
WITH PARTS DEEPLY
CUT



GLOWING ALTERNATELY
ALONG A STALK



OUND, WITH
SCALLOPED EDGE



GROWING OPPOSITE
ALONG A STALK

Honey Bees

Oatland Island Education Center

HONEY BEES

BY

DELORES J. WASHINGTON

INTRODUCTION:

Wherever man has roamed he has carried bees with him. Spanish, Dutch and English settlers brought hives of bees to North America. Some of the bees left the hives provided for them and made homes in trees in the forests. When the Indians found them, they called them "The White Men's Flies".

The bee is a creature and has within its body all the machinery it needs to do many special jobs. The bees of one hive work together with the efficiency of a perfectly organized society.

Honey bees benefit man more so than any other insect. It is the only insect that can work for him. Of primary importance is the work these insects do in helping to grow fruits and flowers. Without bees apple, pear, plum, peach and other trees would bear poor fruit or none at all. There would be fewer kinds of vegetables, and garden crops would be much smaller.

Plants bear good fruit and seed when pollen from one flower is carried to the pistill of another of the same kind. Moving from blossom to blossom in search of nectar and pollen, honeybees are the best of all pollinators. Many farmers rent hives of bees during the blossoming season to make sure their orchards and clover fields are pollinated.

PERFORMANCE OBJECTIVES:

At the end of these activities, the students will be able to:

1. Name the parts of the body of the Bee.
2. Identify the three classes of honeybees.
3. Describe the duties of each class.
4. Define a colony and a beehive.

5. List the uses of honey.
6. Explain the importance of the honeybee to man.

****

ACTIVITY I: Life in the Hive

MATERIALS:

Paper

Pencils

References: See Bibliography

PROCEDURES:

Provide the students with books containing the needed information. Have them research answers to the following questions:

1. What is a colony?
2. What are the difference between social and solitary bees?
3. Why is life in the hive compared to communism?

****

ACTIVITY 2: The Queen Bee

MATERIALS:

Paper

Pencils

References: See Bibliography

QUESTIONS:

1. What is the duty of the Queen?

2. What happens when the Queen is not in the hive?
3. What is fed to the Queen during its larvae stage?
4. What beliefs do scientists have about the Queen's development?
5. What is the life span of a Queen?
6. How many eggs can a Queen lay each day?

****

ACTIVITY 3: **The Workers - Classes of Honeybees**

MATERIALS:

Paper

Pencils

References: See Bibliography

PROCEDURE:

The students will research the following questions:

1. What are the duties of the workers?
2. What duties do the youngest workers perform?
3. What is the life span of the worker?
4. How do the guards identify the hive members?
5. What is unusual about their treatment of strangers?
6. Is the drone important to the hive? Why?
7. What happens to the drone in the fall of the year? Why?

ACTIVITY 4:

MATERIALS:

Paper

Pencils

PROCEDURE:

Take the students on a walk in the community. Have the students observe honeybees visiting flowers. Collect a few flowers and bring them back to the classroom. Have the students identify the plants. Have the students discuss their observations.

****

ACTIVITY 5: The Making Of Honey

MATERIALS:

Ditto sheets showing the body of the honeybees.

PROCEDURE:

Using the ditto sheets, have the students label the body parts, the role each part plays in the collecting of nectar and the making of honey.

****

ACTIVITY 6: Viewing Bees With A Magnifying Glass

MATERIALS:

Jars

Magnifying glass

PROCEDURE:

Have students collect some bees. Mount these and examine them with a magnifying glass. Compare the sizes and determine whether it is a worker or a drone.

****

EXTENDED ACTIVITIES:

1. Determine the uses of honey.
2. Invite a beekeeper to the classroom and have him discuss formulate beekeeping with the class.
3. Research bumblebees. Compare its life-history with that of a Honeybee.
4. Compare the lives of the honeybee to that of the wild bee.

****

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Here Comes The Bees; Goudy, Alice.

No Holidays For Honeybees; Kohn, Bernice.

Wonders Of The Hive; Lavine, Sigmund.

True Book Of Honeybees; Lewellen, John.

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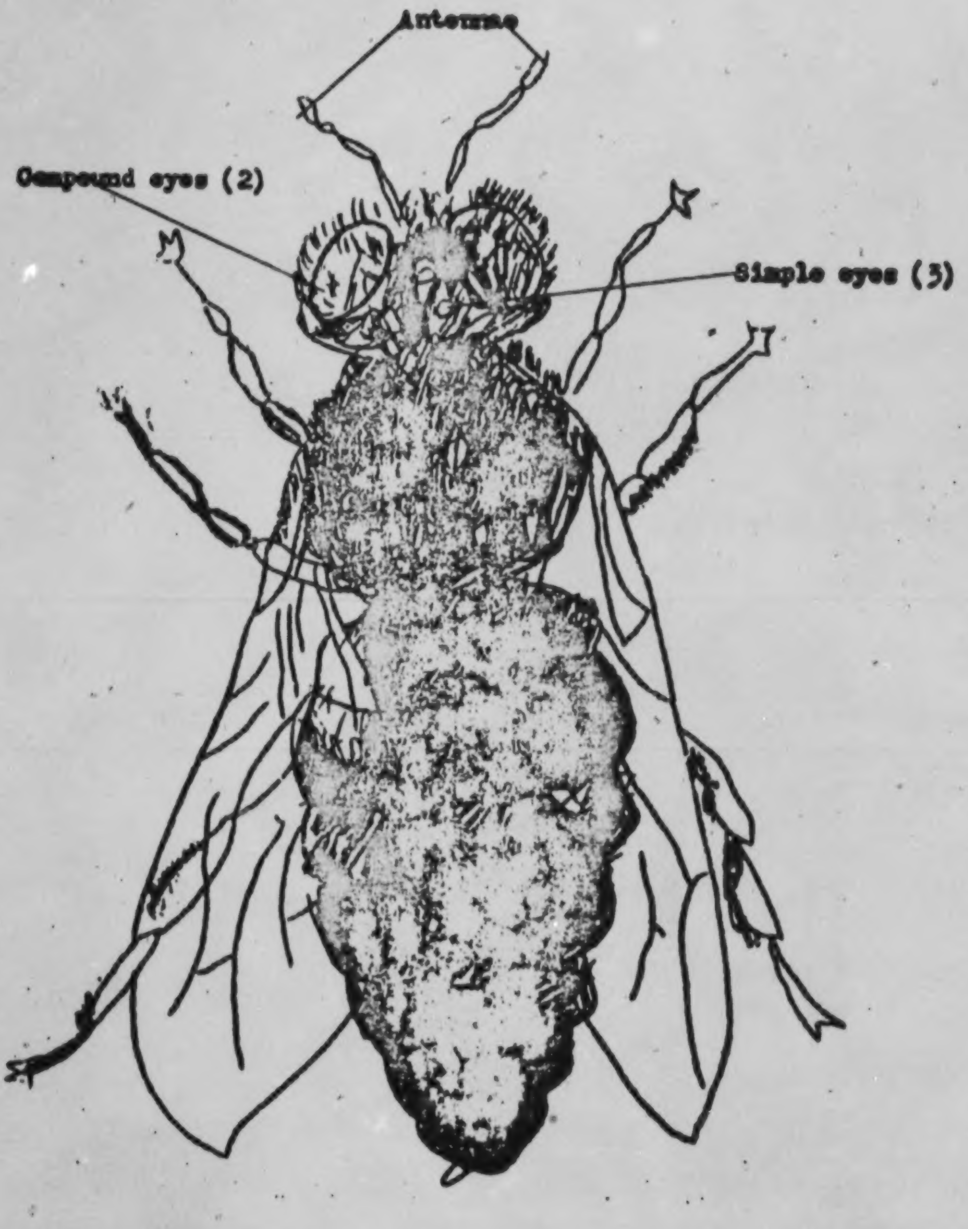
FILMS:

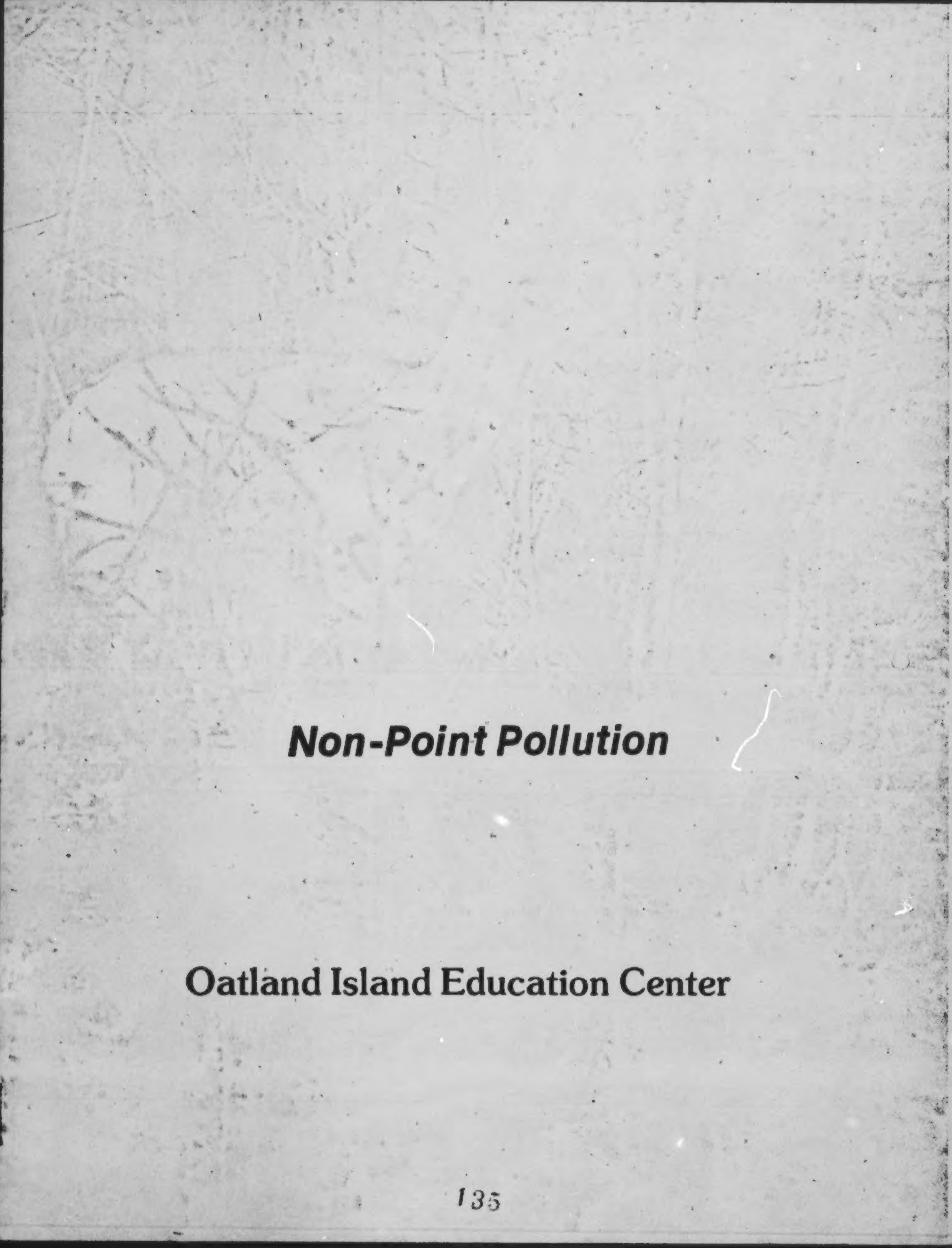
Secrets Of The Bee World (#1205)

Bees And Their Habits (847)

Social Insects: The Honeybee (323)

HONEYBEES


Antennae
Compound eyes (2)
Simple eyes (3)



Non-Point Pollution

Oatland Island Education Center

NON-POINT POLLUTANTS

BY

PAT CRESSWELL

INTRODUCTION:

Most individuals are aware of the fact that manufacturing and industrial processes can cause environmental pollution, but there is also, a type of pollution that few people are aware of. This is generally termed non-point and can result from various natural and man-created processes. These processes tend to be nondiscrete, widespread, and do not arise from any one established place. Because of this, non-point pollutants are not easily abated by treatment facilities and generally end-up in our country's waterways, causing varity of environmental problems. This packet has been designed to introduce students to non-point pollutants and their effect on the environment.

BACKGROUND:

The major non-point pollutions are as follows:

1. Sediments
2. Nutrients
3. Pesticides
4. Organic Wastes

In general, these pollutants are transported via drainage systems to natural waterways. Most of these substances to aquatic life and can ultimately adversely affect water quality.

Sediments is a major non-point pollutants. Look around your city and take notice of the unpaved roads, and construction sites, or even your own home where there the ground-covering is sparse. When rain falls or the wind blows, particles of this bare soil are detached and transported to streams and reservoirs. This can result in a build-up of sediments on the bottom of the stream, inhibiting the rapid flow of stormwater and causing the water to become turbid.

The particle of that soil do not settle are carried along the channels and eventually being emptied into a river or lake. For various reasons gas, oil, phosphates and other chemicals may be attached to these particles.

Chemicals can enter the drainage systems in other ways, also. How many times have you washed your car in the street? Does your car or truck have an oil leak? When it rains, or water enters the drainage path, these chemicals are swept into our channels.

Pesticides are used quite often in farm areas. These chemicals can be transported by careless application, by spray drift, and by run-off into drainage systems.

Another non-point pollutant is generated through organic waste. Forest liter, and animal and human waste are included in this group. Many communities require bagging of cut shrubs, but often limbs are placed in the streets or along a stream. This decayed waste, added to the natural liter of plants creates an added problems towards pollution. Various animals, and unsanitary construction sites can relaease a pollutant of fecal coliform. All of these wastes can be transported by run-off water and to streams.

The end result of these pollutants is quite interesting. When nutrients and organic waste enter a channel or stream, they encourage the growth of small plants called algae or phytoplankton. A high nutrient level increases plant metabolism and causes excessive growth of algae. When the plant die, bacterial decomposers use up the water's oxygen supply. This affects the channels and the rivers when the stormwater run-off is deposited. The low content of oxygen harms the animal life in the waterways

Generation after generation of algae fall to the bottom of the waterway and add to the muck creating shallower streams. This muck added to the excessive plant growth slows down the drainage process.

Much progress is being made to curb non-point pollutants through water quality control and proper maintenance and installation of drainage systems. But through increased knowledge and community awareness of these pollutants a greater effort towards quality water contol could be made.

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OBJECTIVES:

Upon completion of the activities contained in this packet, the student will be able to:

1. Identify the term non-point pollution.
2. Identify five types of non-point pollutants.
3. Describe the effects of non-point pollutants.
4. State the importance of drainage systems.
5. Record information related to the activity.

MATERIALS:

1. Samples of rain water, tap water, and water from a pond, river.
2. Fifteen fish bowls or jars.
3. Measuring cup.
4. Detergent containing phosphates.
5. Insecticide
6. Acid (chlorox can be used)
7. Oil or gasoline.

PROCEDURE:

1: Obtain samples of rain water, tap water, and water from a river.

2: Set up the 15 jars. Make sure the jars are placed so that they are kept at about the same temperature.

3: Pour rain water into 5 of the jars, tap water in the next 5 jars, and river water in the remaining jars.

4: Place an equal amount of the detergent in one jar of rain water, one jar of the tap water and in one jar of the river water. Label each jar. Do the same with the insecticide, acid and the oil. There will be one jar from each of the water group without a pollutant added. Label these jars.

5: Keep a daily record of changes that occur in each of the jars. Compare the changes that occur in each of the jars.

The following is a sample chart that could be used for the recording of information on the jars containing insecticide. A chart should also be made for the jars in the control group, the acid jars, and the jars containing oil.

Day	Insecticide and Water	Insecticide and channel water	Insecticide rain water
1			
2			

EXPANSION ACTIVITIES:

1. Algae counts -- Use 1 ounce of water from each of the jars. Count the number of algae. If there were 32 ounces of liquid in the jar, multiply the count by 32 to get the approximate count of the total jar.
2. Visit a grocery store and check the contents of phosphates in detergents. Determine the detergents that are more suitable for the use in relation to environmentals standards.
3. Start a collection of pressed plants specimans collected from around a canal or pond area.
4. Make a model of a river system.
5. Research and observe the various types of drainage systems.
6. Invite a resource person to class and discuss various types of environmental controls.
7. Graph and compare the results of the experiments.

RESOURCE INFORMATION:

The following individuals or agencies can provide further information for a complete unit of study in the area of non-point pollution.

RESOURCE PERSONS:

Water Pollution Control Federation
3900 Wisconsin Avenue
Washington, D.C. 20016

U.S. Corp of Engineers in Savannah
Department of Regulatory Functions
Steve Osvald or Tom Skordal

Department of Natural Resources
Environmental Protection Deaprtment
Leonard Ledbedder
270 Washington Street, S.W.
Atlanta, Georgia 30334

Chatham County Engineer
Tom Smith

Environmental Protection Agency
Washington, D.C. 20016

Skidway Island Institute of Oceanography
Savannah, Georgia

Soap and Detergent Association
475 Park Avenue South
New York, N.Y. 10016

FILMS:

1. "Aquatic Weed Control" (16mm, 17 min.)
   Problem of weeds in water environments and methods of control.

   Chevron Chemical Company
   Advertising and Public Relations
   Ortho Division
   200 Bush Street
   San Franciso, Calif. 94120

2. "Aqua Folly" (16mm, 33 min.)
   Explains need for water conservation through watershed management.

   Boyd Film Company
   1569 Selby Avenue
   St. Paul, Minn. 55104

d. a and b of the above.

5. List five major areas of non-point pollutants.

a.____________________________________

b.____________________________________

c.____________________________________

d.____________________________________

e.____________________________________

True or False

6._____ Non-point pollutants are widespread.

7._____ Non-point pollutants adversley affect drainage systems.

8._____ Thermal pollution can cause fish kills.

9._____ The shade of trees helps to prevent theraml pollution.

10._____ Sediment pollution is caused by particles of soil.

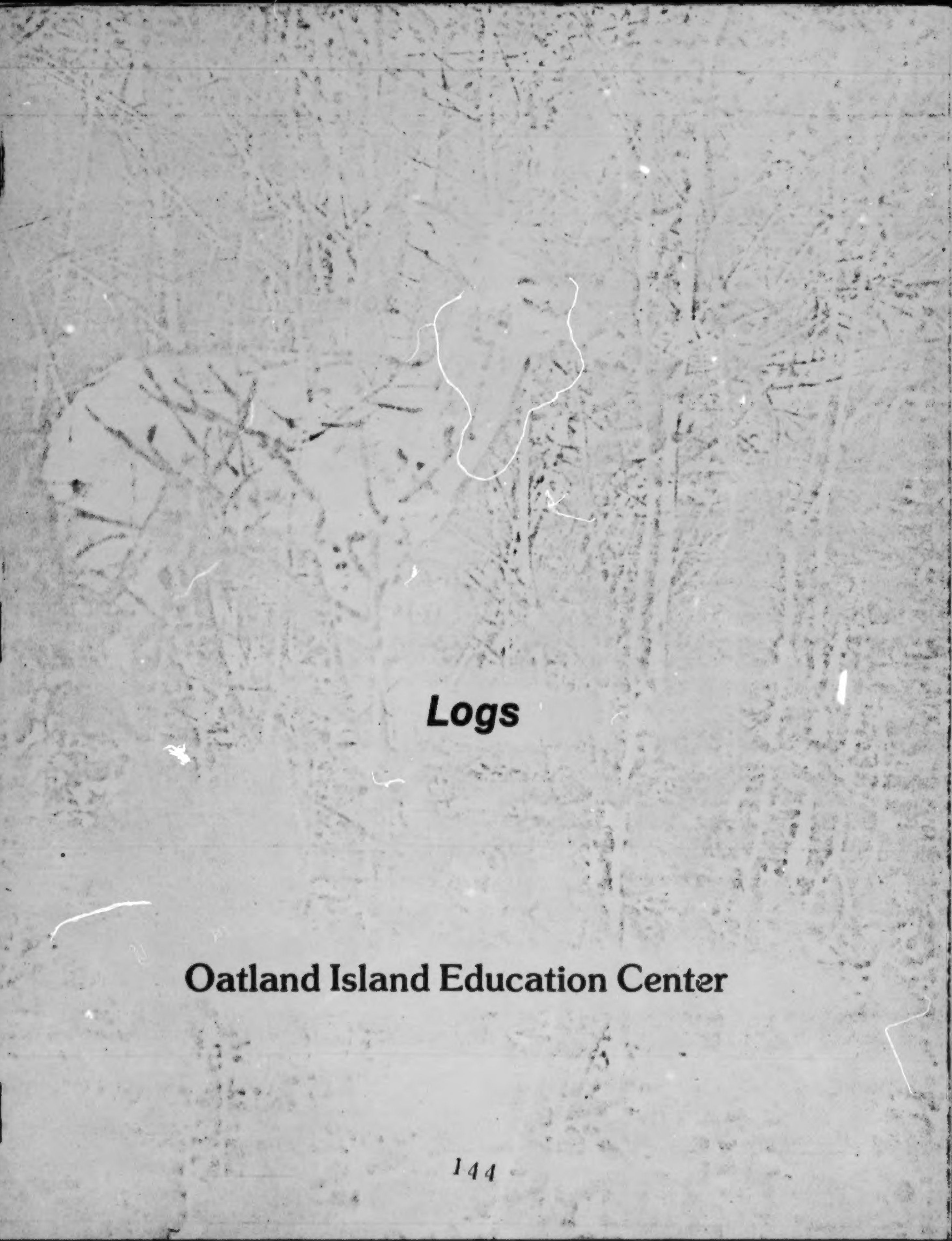
11._____ Sediment pollution causes a build-up of sediment on the bottom of waterways.

12._____ Debris from forests enriches the waterways.

13._____ Metabolism is the rate of flow of the pollutants.

14._____ Algae growth helps to decompose bacteria.

15._____ Bacterial decomposers survive by the use of nitrogen.



Logs

Oatland Island Education Center

IS A DEAD LOG REALLY DEAD?

INTRODUCTION:

A large sized tree grows a strong trunk and appears as though it could live forever. However, every living thing has a limited life span. Sooner or later the growth of the tree slows down and it become more susceptible to diseases that can damage or kill the tree. Eventually it dies. The dead tree might stand erect for many years, but it will eventually fall to the ground. At this point the tree becomes a log.

A great oak might have grown for centuries, but ten years is sufficent time a large tree to be completely decayed. During that ten year period, the log can be a source of food for a variety of herbivor, which in turn becoms the food of organisms. Also, the dead log becomes a habitat for a myraid of animals.

The following activities have been designed to introduce students to the environmental importance of a piece of decaying wood.

PERFORMANCE OBJECTIVES:

Upon completion of these actvities, students will be able to:

1. Identify the organisms found on a decaying log.
2. Identify plants on a decaying log.
3. Name the type of tree the log is.
4. Explain why some logs have more life than others.
5. Construct a dead log terrarium.

PROCEDURE:

Schedule a field-trip to Oatland Island. Divide the class into groups of four or five. Have each group locate a decaying log to study.

MATERIALS:

1. Jars with lids
2. Magnifying glasses
3. Tablet for recording

ACTIVITY I: **Insects**

Examine the log for insects and collect sample of specimens of each different type found. Count the number of each type of insect found on the log. Such insects to look for would include the following:

1. Beetles
2. Millipedes
3. Pill bugs
4. Roaches
5. Termites
6. Ants

If there is bark on the log, remove it to discover if insects are living underneath. Look for eggs and larvae of the insects. After returning to the classroom identify the insects using references materials. Let the different groups compare the number of kinds of insects collected.

ACTIVITY 2: **Plant Life**

Collect and identify specimens of plant life. These would include:

1. Mosses
2. Mushrooms
3. Licken
4. Fung
5. Slime mold

Again let groups compare amount and type of plant life.

ACTIVITY 3: **Animals**

Search for animal life on the log. Logs located in damp areas have a better chance of being inhabited by such animals as salamanders, lizards, frogs, and snakes. Look for signs of larger animals near the log.

ACTIVITY 4: Kind of Tree

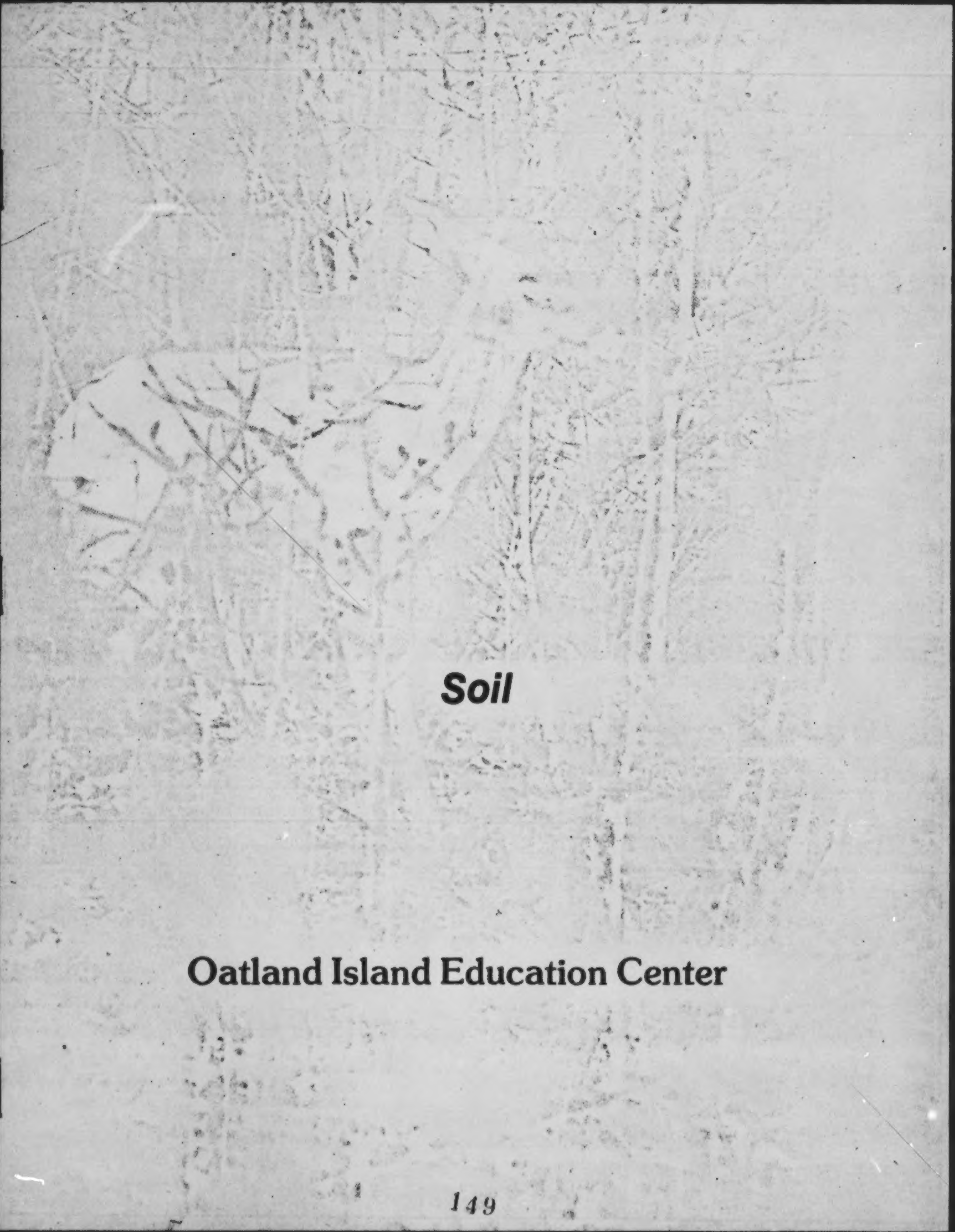
Identify the type of tree in each study area. Compare the numbers and types of life on the different trees. If you are unable to identify what type of tree the log is, note the kinds of trees still living in the area.

After all four of these activities are completed, let each group report the findings. Describe the area of each log. Determine which group had the oldest log and what accounts for the different numbers of life on the different logs.

ACTIVITY 5: Construction of Log Terrarium

To build a terrarium, use an aquarium or a wide-mouth jar. Place a little soil as a base. Find a decaying log and remove a small section for the terrarium. Place this inside the container. Try to include all the organisms found on that section of the log. Add a small amount of water. Cover the container with a glass plate so that the water will be retained. As you watch the activities within the log, note whether there is need for more water. Add just enough to make it as wet as it was in the woods.

If you keep the log terrarium for a number of months, you will observe stages in the development of some of the insects. Observe all changes and record them.



Soil

Oatland Island Education Center

SOIL:

By

Gail Culbreth

Cindy Smith

INTRODUCTION:

There are 205 million Americans occupying 2.3 billion acres of land. Based on this, each individual has approximately eleven acres of land for his use. In the year 1940, the average was about 18 acres per person, and estimates based on population increases show that by the year 2000 this average will decrease to less than seven acres per person.

Because of this it is imperative that all Americans become aware of how important land resources are, especially the soil. It is true that the soil occupies only a thin layer of the total earth's surface. Yet, soil may possibly be one of Man's most important resources. Can you imagine how different our lives woulf be if there was no soil!

Soils are mediums in which plant seed germinate and send forth roots that mine the soil for nutrients and minerals that are essential for plant development and growth. Ultimately if the needs of the developing seeds have been met, a plant will develop. It might be a grass, a tree, or a flower but it will be a plant and capable of carrying out the biological process of photosynthesis; without this process where would Man's food come from? All animals, including Man, must rely on plants for food-and plants must have soils in order to grow.

It has taken millions of years for the Earth soil-resources to build-up. Soil is formed through the breakdown of rock, generally being caused by the weathering effects of wind and water.

Also, organic matter, in the form of humus, is continually being added to soil, increasing its fertility and abilities to support plant growth.

If the past and present wasteful agricultural and construction practices of man continues, it is a real possibility that future generations of Americans will exit in a country that is almost totally devoid of soil resources. If this occurs food supplies will be greatly reduced, causing tremendous hardships on all the people of earth. To insure that this does not happen, the American public must learn how to utilize this country's soil-resources. This is the only way that future generations of Americans can enjoy a quality of life comparable to ours.

The activities contained in this packet have been designed to give students a understanding of the importance of soil, its uses and misuses.

PERFORMANCES OBJECTIVES:

Given the opportunity to complete the activities presented in this packet, the student will be able to:

1. Explain how different soils effect plant growth.
2. Determine which soils contain a higher percentage of organic matter.
3. Describe how organic matter influences soil fertility.
4. List reasons how vegetation can prevent soil erosion.
5. Describe soil conservation practices.
6. Describe how different types of vegetation effect the moisture? Content of soil.
7. Explain how organic matter can effect the fairability of soil.
8. Identify animals found in a soil sample.
9. Explain how vegetation can effect the number of organisms found in the soil.
10. Distinguish between different types of soil erosion.
11. Explain why some soil can retain a higher percentage of water than others.
12. Define soil.
13. Define salt.

ACTIVITY I: Demonstration of How Soils Are Formed.

BACKGROUND:

Most Soils are formed from rocks thru weathering processes. The rate of the decomposition is effect by temperature; this demonstration has been designed to show heat effects the decompostion process.

MATERIALS:

1. Alcohol burner
2. Fongs or insulated gloves
3. Medium size pan
4. Ice water
5. Small soft rocks (limestones, sandstone, brick).

PROCEDURE:

Heat a small piece of rock over an alcohol burner. After this has taken place, place the rock in a pan of ice water.

RELATED QUESTIONS:

1. Why did the rock react to the water?
2. Would all types of rocks react the same?
3. Do all rock decompose at the same rate?
4. How does temperature effect rock decomposition and soil formation?

ACTIVITY 2: Demonstration of How Different Soil Effect Plant Growth.

BACKGROUND:

Plants obtain nutrients and essential minerals from the soil. Because of this, the fertility of the soil effects the rate of plant growth. Also sils can differ in the quality of their fertiliness. In general, soils with a higher amount of organic matter will be richer and more suitable for plant growth. The activity has been designed to demonstrate how different types of soil can affect plant growth and development.

MATERIALS:

1. Four pots of equal size.
2. Four soil samples.
3. Seeds; (corn, bean,) etc.
4. Spade
5. Watering devices.
6. Paper
7. Pencils

PROCEDURE:

Collect soil-samples from different areas. (Some examples of places to collect the samples from are as follows: garden area, beach, vaccant lot, construction site, forest, and road shoulder). Place soil samples in pots and label. Sow several of the same type seeds in each pot. Water the soil and place the pots in a sunny location. Check the pots frequently and record plant growth and development.

RELATED QUESTIONS:

1. In which type of soil did the plants grow best?
2. What measures could be taken to enrich the soil samples?
3. Which soil sample showed no evidence of plant growth?
4. Which soil sample had more organic matter?
5. How did the organic matter effect the fertility of the soil?

ACTIVITY 3: Prevention of Soil Erosion

BACKGROUND:

This activity demonstrates how ground cover serves to reduces soil loss. Basically this is accomplished in two ways. First, the roots of plants tend to anchor and bind the soil together. A prime example of this in the Chatham County area is the Salt Marshes. The predominant plant of the marsh is Spartina Alterni Flora or cord grass. The roots of this grass can reach a length of six feet. The extensive root system of these plants are the main reason why the tidal currents do not erode away tremendous portions of the marshland.

Secondly, ground cover such as leaf litter, mulch and other organic material protects soil from wash off caused by rain.

This activity demonstrates how much the two types of ground cover prevents soil erosion. Also, this activity demonstrates how the slope or topography of ground influences erosion.

MATERIALS:

1. Three boxes - 12X16X4. (notch out one end of each box).
2. Three 1/2 gallon watering devices.
3. Three large wide mouth jars.
4. Three soil samples. One samples should be from a grassy area and should be collected with the grass covering still intack. The second sample should be barren soil that can be covered before beginning the activity with a mulch of leaf litter, wood shavings or pine straw. The third sample should be left barren and uncovered.

PROCEDURE:

Fill each box with a soil sample. Following this, elevate one end of each box. Place a jar or bucket at the lower end of each box to catch the runoff. Next, sprinkle or pour water along the raise end of the boxes.

Present the following questions to the class.

1. Which box showed the greater signs of erosion?
2. Which soil sample retained the greatest amount of water?
3. Did the mulch effectively prevent soil loss?
4. What would this activity demonstrate to farmers?

SOIL-STUDY - A FIELD ACTIVITY

Schedule a field-trip to the Oatland Island Education Center. After arriving at the Island. Locate three different sampling sites. One site should be in forrested area and the ground should be covered with leaves and/or other organic litter. The second site should be in an open field area, perferable an area either cover with a stand of wild grasses or low shrubs. The third site should be an open area that is barren (no plants or organic coverings).

In each site mark off a quadrat that measure one square meter. Collect samples from within each of the quadrats and complete the following comparisons and record their results on the data sheet.

MATERIALS:

1. Note pads
2. Pencils
3. Shovel
4. Large sheets of white paper
5. Collecting jars
6. Three wid-mouth jars filled with water.
7. Three pieces of wire cut to fit in the wide-mouth jars.
8. Hand lens
9. Meter stick

A. Observation One - Moisture Content

Have students place a soil sample from each area into a jar.

Compare the samples and determine which sample contains the most moist.

Present the following questions to the students.

1. In which sample area was the soil more compacted? Why?
2. How does the loseness of the soil effect its water retention ability?
3. In which sample area would the drying effect of the sun be more intense?

B. Observation Two - Soil Color

Have students observe and compare the color of each soil sample.

Present the following questions.

1. Does the amount of moisture in a sample affect its color?
2. From what area was the lightest colored sample collected?
3. Where was the darkest sample collected?
4. What causes the color variations in the samples?

C. Observation Three - Signs of Erosion

Have students compare and contrast the three sample areas. The students should specifically look for signs of either soil build-up or erosion.

Present the following questions.

1. In which area did the conditions for soil build-up exist?
2. What role does forest litter play in soil build-up?
3. In which of the sample areas were signs of soil-erosions most evident?
4. How does vegetation prevent soil erosion?

5. What part of the plant holds the soil together?

6. Is there any evidence that man has directly caused erosion in any of the sample areas?

D. Observation Four - Erosion Test

Have the students collect a sample of soil about the size of an egg. Place each sample in a wire screen basket (the wire screen should be fashioned so that it resemble a small tea strainers). Slowly lower each sample into a jar that has been filled to within one inch of its top with water. Present the following questions.

1. Which samples retained its shape?
2. What accounts for this?
3. Why did the sample from the barren area fall apart?

E. Observation Five - Soil Organisms

Have the students collect a fresh soil sample from each of the study areas and spread each sample on a separate sheet of white paper or other suitable substrate. Instruct the students to observe and record the number and type of organisms found in each sample. These organisms should be placed in a jar and preserved for future or classroom studies. Also, if possible a soil sample from each quadrant should be returned to the classroom and placed under a microscope. This will allow students to observe soil-micrognanisms. As a follow-up activity, the field-trip data can be analyze and discussed in the classroom. All students should be encouraged to particpate in this activity.

Sample listing of Soil Organisms

1. Worm
2. Grubs
3. Insects
4. Snails
5. Spider
6. Mites
7. Ticks

F. Observation Six - Tour of Erosion Sites

After completing the field-trip activities and if time allows have the class tour and observe a number of different areas that show signs of erosion. It should be remembered that erosion is the major course of top soil depletion and erosion is the end results of many different factors. Wind, water cultivation practices and construction all contribute to erosion. If possible the class should view sites that demonstrate erosion caused by all fore-mentioned factors. Have the students determine and record the causes of the erosion. Also have each student prepare a listing of measures that could halt the erosion process.

EXTENTION ACTIVITIES:

1. Invite a Representative from the Soil Conservation Service to your class and have him discuss the responsiblities of the Service and what measures are being taken to control erosion in the Chatham County Area.
2. As and on-going activity have the class start compost pile on campus. The students could monitor observe and record the changes that took place during the composting process. This is an demonstration of how soil is made and also nature recycles nutrients. For details of how a compost pile is made, contact

the County Extention Agent.

REFERENCES:

Teaching Soil and Water Conservation; U.S. Dept. of Agriculture
Soil Conservation Service.
To Save the Soil; Talley, Naomi.
The Soil that Feeds Us; Heady, Eleanor.
The Dirt Book; Evans, Eva.
The World Beneath Our Feet; Keen, Martin.
Soils; Matthews, William.
What is Soil?; Syrocki, John.
Freedom and Plenty, Our to Save; Bronson, Wilfred.

FILMS:

Our Endangered Soil
Conserving Our Soil
Your Friend The Soil

FILMSTRIPS:

Plants and Animals on a Vacant Lot

REFERENCE:

Conservation and You; Sorenson, Mitch.
The Story of Soil; Allen, D.H.

ORGANIZATIONS:

District Conservationist; U.S. Soil Conservation Service Room 234,
U.S. Post Office and Courthouse Wright Square, Savannah, Ga. 31401
U.S. Department of Agriculture; Soil Conservation Service, Raleigh,
North Carolina 27611.

Soil - Field Trip Data Sheet

	Amount of Moisture	Looseness of Soil	Color	Signs of Erosion	Common Names of Animals Found
Soil With Organic Covering					
Soil With Grass Covering					
Soil Without Ground Covering					

Composting

Oatland Island Education Center

THE VALUE OF COMPOSTING

BY

EDWARD A. CAUGHRAN

INTRODUCTION:

A study of tree development shows that the minerals that are taken from the earth by the roots of the tree are used by the leaves to make food for tree growth.

In the fall of the year the tree looses its leaves. These leaves are valuable in many ways. Leaves that are left on the ground decay become humus, humus in the soil helps hold moisture and in this way minerals are returned to the soil. This is one of natures ways continuing the life cycle.

This paper asks students to consider how man changes natures process in our cities and particular our own yards. To maintain beautiful yards we purchase many different types of fertilizers, potting soils, fill dirt and peat moss. At the same time we are spending money on these items, we are also working hard raking leaves, bagging them for removal, or in some cases are burning these valuable leaves.

The compost pile has been proven to be a necessity to the city garden, the truck farm, and to many large communities. The activities in this project will help you to see the value of composting in your own life.

Practically any plant material can be composted for use in the garden. Leaves, lawn clippings, and straw can be used. Organic matter improves soil as a growing medium for plants by releasing nitrogen, minerals, and other nutrients for plant use, also, compost on the soil helps keep the soil surface from crusting, retards water loss and keeps weeds from growing.

Students need to know how to use and conserve natural resources in a manner that is beneficial to all.

PERFORMANCE OBJECTIVES:

The student will be able to:

1. Construct a compost pile.
2. State the values of using organic matter in gardening.
3. Explain the advantages of placing mulch around plants.
4. Know the time of year to mulch plants.
5. Collect a soil sample.
6. Plant seeds using compost.

UNIT MATERIALS:

1. Bin 6' X 6' X 6' or a cylinder formed by chicken wire.
2. Leaves
3. Straws
4. Left over food
5. Garden fertilizer
6. Soil
7. Seed pots
8. Tomato seeds
9. Sand
10. Soil Sample Bag
11. Plactic Bag
12. Shovel

TOPIC: Soil Testing

INTRODUCTION:

The soil is your plant's home, and the growth of your plants, grass, and garden will depend on the condition of the soil. A soil test will help you determine what you need to add to the soil to make it proper for the purposes that you have in mind.

Many Georgia soils are low in one or more of the essential plant nutrients. Therefore, to maintain normal plant growth, lime and fertilizer must be used in sufficient quantity to meet the crop's needs. Your soil test results will give you this information.

Each student involved in this activity should follow the instructions for soil testing, using samples from his own yard.

PROCEDURE:

1. Use a spade that can take a thin, vertical slice of soil to a depth of 4 inches.
2. Take at least 12 slices from various parts of your yard.

. Place the samples in a clean plastic bucket and mix well. Fill the soil sample bag 3/4 full and place one cup full in a clear plastic bag.

3. When collecting the sample, avoid high and low spots, eroded areas and areas along roads and fences.

All samples can be taken to the Cooperative Extension Service office in the county. In Savannah this office is located in the Federal Building on Wrights Square. There is no charge for this routine soil sampling test. The test will be done in the laboratory at the University of Georgia. Your local agent will make necessary recommendations for each sampling. This process will take about 10 days.

During the time that soil samples are being tested the second sample in the clear plastic bag can be used in the classroom for making the following comparisons.

1. Looks
2. Feel
3. Smell
4. Weight

After this comparison is made you need to discuss the various types of soil found in your community.

After the county agent makes his recommendations to each student, this information should be discussed with the students family in hopes that if implemented, a better lawn and garden can be developed.

****

TOPIC: Building A Compost Pile

INTRODUCTION:

The usual practice in building a compost pile is to construct it in some out-of-the way place in the garden or yard. It can be built on open ground or in a bin made of cinder blocks, rough boards, or wire fence. The sides of the bin should not be airtight or watertight. The best time to start your compost pile is in the fall when leaves are plentiful.

PROCEDURE:

In building the compost pile, spread out a layer of plant material about 6 inches deep and add a cup of garden fertilizer and about one inch of soil. This is repeated until you have filled your bin. Most likely you will not complete this pile at one time. You can add to the pile as material is available. For convenience you may wish to have more than one pile.

Many people throw left over food, fish heads, shrimp shells and etc. into their compost pile, but when this is done a bad oder can be detected and might be disturbing to you and your neighbors.

Other food items that might be used that do not create a bad oder are fruit peels, wood shavings, coffee grounds, eggs shells and even the shaving from the pencil sharpeners.

When properly and thoroughly decayed, compost is not likely to harbor diseases or insects. Most seeds that are in the pile will also be decayed or dead.

For a continuing supply of compost, a new pile should be built every year. Compost can be used as mulch, or worked into flower beds and the vegetable garden.

****

TOPIC: Mulching Plants And Shrubs

INTRODUCTION:

During the fall you can benefit your plants and shrubs both at home and at school by placing mulch around the bottoms of each plant.

This simple activity will provide warmth, nutrients, and will prevent erosion and weed damage.

Pine straw is excellent and best of all, it's free for most of us. Our yards, parks and wooded areas provide us with a generous supply. If you look around your neighborhood, you might find bags of straw in front of several homes. These people do not know the value of mulching.

PROCEDURE:

1. Rake up piles of pine straw, fill boxes or bags and take to area that plants and shrubs are located.
2. Use rake, or hand fork to work up ground around plants.
3. Apply light layer of fertilizer to area.
4. Spread pine straw around plants to a heighth of 4 to 6 inches.

During the winter you may need to add additional straw due to packing and decay. You may wish to lift the straw and observe the difference of the protected area and the nearby unprotected areas.

In the spring you will need to remove this mulch and place same in your compost pile, so that the ground will absorb the warmth and moisture needed for the growing season.

****

TOPIC: Using Compost And Sand To Start Plants

INTRODUCTION:

Most plants can be started in compost, but for this activity we will start tomato plants.

PROCEDURE:

1. Remove from the compost pile some of the most decayed material and with your hands rub and break up material until you have 2/3 of a 5 gallon can filled.
2. Place lid on can and shake for 2-4 minutes each day for 5-7 days. After shaking each day remove top and work material with your hands.
3. Fill 2 large (2 to 3 inches deep) glass or steel pans with compost and place in oven for 1 hour at a setting of 200 degrees. This will sterilize the compost.
4. After the compost has been sterilized, mix 2 parts compost with 1 part washed fine sand.
5. Fill peat pots with compost-sand mixture that has been dampened with water. Place pots in room that will be reasonably warm at all times and that will provide a minimum of six hours of sun light daily.
6. Place 2 tomato plant seeds in each pot after making two 1/4 inch deep holes with a pencil point. Pat down top of soil. Use a spray bottle to add moisture and continue to moisten soil as needed.
7. Plants will break the soil in 10-14 days or as stated on package of variety of seeds used.
8. After each plants develop leaves you may wish to remove the weakest of the two plants.
9. After the ground is warm and the plants are 6-7 inches tall, you can place the plant with the pot into the ground or in 5 gallon containers of compost. (Since school will be out before full development is reached the students should take the plants home with them.

TEST

1. When leaves decay underneath the trees, they become_______________.

   a. dirt
   b. dry
   c. humus
   d. wet

2. The_____________ pile has been proven to be a necessity to the city garden.

   a. compost
   b. junk
   c. dirt
   d. straw

3. Only one of the following can not be used in a compost pile. Which one is it?

   a. leaves
   b. tin
   c. left over foods
   d. lawn clippings

4. The best time of year to start a compost pile is________________.

   a. summer
   b. fall
   c. spring
   d. winter

4. Compost can be used as a___________________.

   a. mulch
   b. insect control
   c. vegetable
   d. dirt

6. Mulch provides__________________.

   a. soil
   b. nutrients
   c. sun
   d. water

7. In Savannah____________is an excellent mulch.

   a. leaves
   b. pine cones
   c. pine straw
   d. water

8. Mulch should be removed from plants in the_________________.

   a. spring
   b. fall
   c. summer
   d. winter

9. A soil ______________ is a necessity for good production.

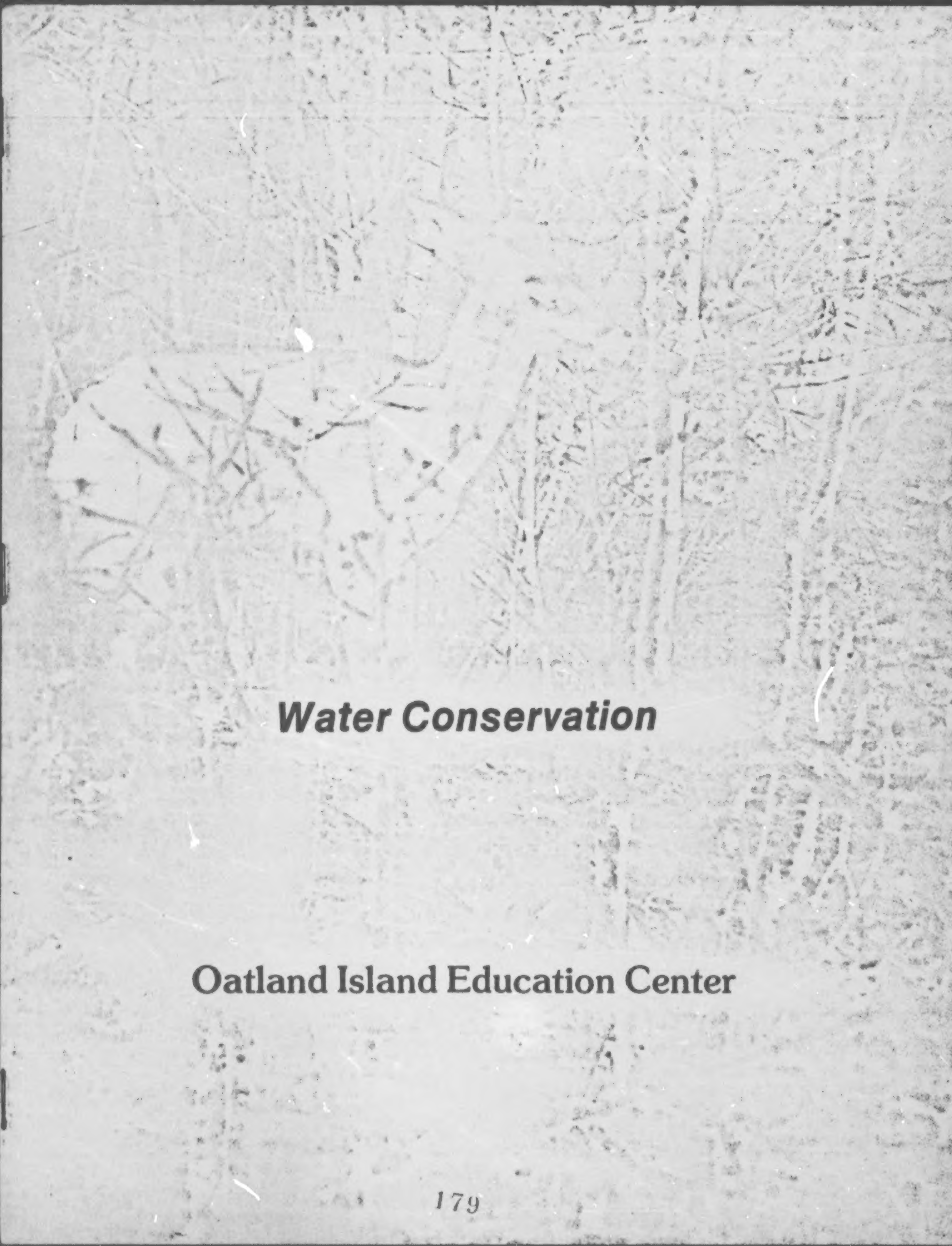
a. dump c. pile

b. test d. fertilizer

10. To sterilize soil you bake it at __________ ° ______.

a. 100° c. 200°

b. 300° d. 50°



Water Conservation

Oatland Island Education Center

WATER CONSERVATION

BY
WILLIAM A. CLARK

PROBLEM AREAS:

Water Supply

Water Pollution

Soil Conservation and Land Use

INTRODUCTION:

During the spring, summer, and the early fall of 1976, a severe drought struck England and parts of Europe. As well documented in American newspapers and weekly news magazines of the period, no country was as severely affected as Great Britain. With the normal precipitation pattern interrupted, water reservoirs and catch basins soon dried up. That mighty source of water and means of communication, the Thames River, dried to a mere trickle, halting all shipping.

As water levels and tables became depleted, the British People were asked to leave their cars dirty and not to wash them. They were asked to let their lawns and flower gardens die and not water them. They were even asked not to take baths as often as usual. As a pain for ignoring these requests, many local governments imposed fines.

Finally, early September 1976 saw an end to the drought. Although a pleasant relief, the end to the dry weather did not present an immediate solution to the problem. Many hydrologists estimate that will require several years of above normal rainfall to re-establish previous water levels in Great Britain.

We Americans tend to take our water supply for granted and sometimes even ignore its delicate existence, especially when not confronted with drought conditions. Few Americans are concerned that increased water usage and pollution could some day deplete fresh water supplies.

Fresh water supply is dependent upon well known conditions. The continued availability of a fresh water supply is controlled by how fast used quantities are replaced by natural means. What we do not know is, at ever increasing demands, just how long will an adequate supply be available?

This study is designed to teach the general principles of water supply. Special emphasis is placed on the means by which Chatham County obtains its supply of water for human and industrial consumption.

PERFORMANCE OBJECTIVES:

At the end of this study, each student will be able to:

1. Define the term "evapotranspiration."
2. Explain how surface and ground water is replenished by means of precipitation.
3. Explain water flow.
4. Research and Construct a model of a watershed containing these features: initial collecting surface, a stream, and a collecting basin or reservoir.
5. Define the following terms: soil permeability, surface water, capillary action, infiltration, ground water, water table, spring, artesian well, and aquifer.
6. Research and Construct a model of an aquifer containing these features: area of recharge, ground surface, water table, top impervious clay bed, sandstone aquifer, bottom impervious layer, and an artesian well.
7. Explain from what sources water for human and industrial consumption is secured.
8. Observe, Collect and Label, and Test water from areas in Chatham County which are examples of water pollution.
9. Identify areas in Chatham County that are examples of good soil conservation and areas of soil abuse.
10. Explain why there are large ditches cut through the Windsor Forest area.

MATERIALS:

2 Aquariums with glass tops

5 Healthy house plants

2 Small dishes filled with water

1 Round glass casserole dish approximately 1' diameter.

2 Quarts sand

1 Breaker of water

1 Potted house plant containing small-grained potting soil.

1 Potted house plant containing large-grained potting soil.

1 Small pot or pan filled with water.

1 1/2 inch length of thick string.

2 Water-tight boxes approximately 2' X 3' X 3'

1 Plot of grass sod 2' X 3'

20 Gallons soil

15 Gallon water sprinkler

1 Shoe box

50 Gallon (approximately) soil to fill each student's shoe box

900 Toothpicks dyed green to represent trees

1 Coffee urn with small spigot

1 Water tap (could be a large pitcher of water)

1 Piece white poster paper 2' X 1' per student

1 Bottle clear fast-drying glue

1/2 Gallon each 4 different colors of sand (hobby shop or teacher made)

1 Clear soda pop straw per student

1 Pint freshly prepared concentrated ferrous sulfate solution

1 Pint acetic acid

1 Pint diluted solution of sodium nitrate

1 Quart tap water

3 Test tubes per student

1 Graduated cylinder per student

1 dropper per student

PROCEDURE:

1. The teacher will present a lecture or have students research the basic principles of precipitation. The following points should be covered: evaporation, transpiration, and how water is returned to earth by precipitation.

2. The teacher will demonstrate evapotranspiration by displaying two previously prepared aquarium tanks with glass tops. Both tanks will contain the same type soil. One tank will have been planted with house plants and will contain two small dishes filled with water. The other tank will have no water dishes or plants. The students will observe the difference in the two glass tank tops. (If the water dishes are removed and the demonstration re-started, the observable results will be an example of transpiration).

3. The teacher will demonstrate a water table and lateral water flow by means of a clear glass casserole dish containing sand and water. When water is poured into the dish about 3/4 full of sand, water will collect in the bottom. The top of the saturated one represents a water table, (fig. A.) If a V shape is made in the sand, water will rise in the channel, this may represent a stream channel, (fig. B.) If water is slowly poured on the sand from one side of the dish, it will slowly move laterally toward the V cut. (fig. C.)

4. The teacher can demonstrate soil permeability by two potted plants of the same kind but with two different types of potting soil. One soil should be small-grained and the other large-grained. When the amount of water is poured into each pot, the large-grained soil will release its water very quickly.

5. The teacher will demonstrate land use, soil conservation, and soil permeability by having the class compare the water run-off from two previously prepared boxes. Each box must be water-tight. Each box must contain the same kind of soil. The top of the soil in both boxes must be level with the tops of the boxes. The soil in one of the boxes will have been planted or sodded with grass, the soil in the other box will have no vegetation. The run-off from each box will demonstrate infiltration qualities of representative areas. If both boxes

STEP 3

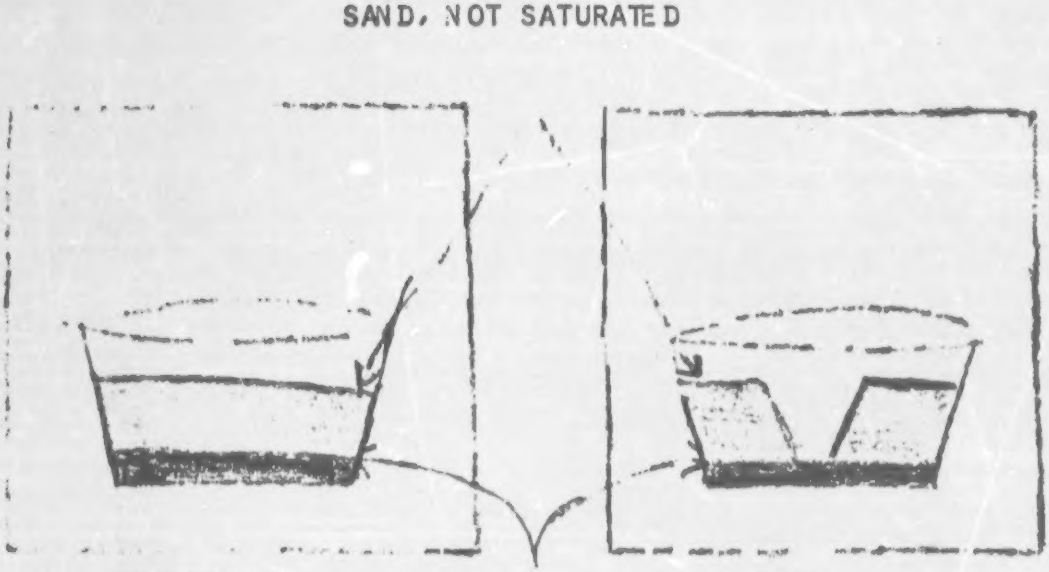

SAND, NOT SATURATED
TOP OF SATURATED ZONE
(WATER TABLE)

FIGURE A

FIGURE B

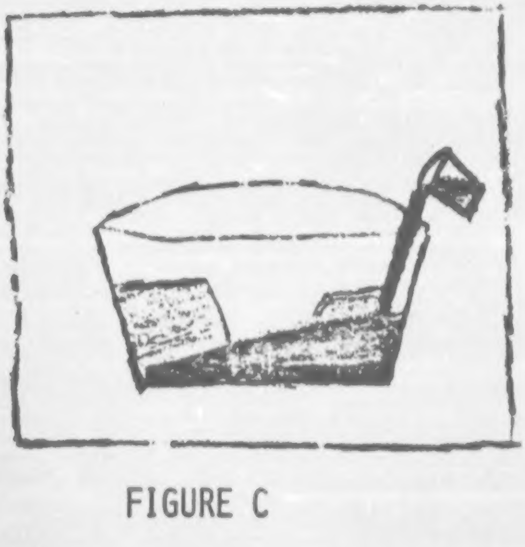


FIGURE C

are completely permeated with water, the run-off will be the same thus demonstrating another point of hydrology.

6. The teacher will demonstrate capillary action by means of a pot or pan filled with water into which a string has been placed with one end of the string hanging over the side of the pan to a lower level than the pan itself.

7. Each student will research and contruct a model of a watershed. The student will be presented with his own shoe box containing soil. He will be given about 30 green toothpicks to represent trees. Without any research, each student will be asked to construct his model containing these features:initial collecting surface, a stream, and a collecting basin or reservoir. Having completed this activity, each student will research the subject in the school library and will return and make necessary corrections to his model.

8. The teacher will urn or similar container with a small spigot to demonstrate why it is necessary for cities that depend on surface water to build catch basins or reservoirs. The small spigot represents the water demanded by the city. The urn represents the reservoir and a water tap represents precipitation and surface water. During periods of no precipitation (water tap turned off), if correctly planned, the city should be able to continue its usual water demand rate until the next period.

9. Each student will research and construct a model of an aquifer consisting of these features: area of recharge ground surface, water table, top impervious clay bed, sandstone aquifer, bottom impervious layer, and an artesian well. The model may be constructed presenting a side view on a white poster-paper background. Four different colors of dirt or sand (may be purchased at a hobby shop or may be teacher made) will be used, along with a soda straw to represent a well. These items may be adhered to the poster paper with glue for a permanent display.

10. The class should discuss the affects of water pollution on a water supply. A field trip should be taken to include at least 3 areas containing water pollution. These may include, The Savannah River, ponds, ditches, and creeks. At each location, each student will collect and label location, date collected, samples. Upon returning to school the following test will be conducted to confirm decomposing organic or animal matter in the polluted water: pour 10 cubic centimeters of diluted sodium nitrate in one test tube, 10 cubic centimeters of tap water in another test tube, and 10 cubic centimeters of the sample collected in a third test tube. Pour into each test tube a few drops of acetic acid. A brown coloration indicates the presence of a nitrate. Nitrate is formed by the decomposition of organic matter.

EXPANSION ACTIVITIES

1. A field trip to local water department wells and service areas.
2. A discussion by a representative from the local water department.
3. Estimating the approximate amount of water the school uses each day.

WATER CONSERVATION

TEST

Multiple Choice

1.____ is an underground water source enclosed by impervious material.

(a) A water table (c) An artesian well

(b) An aquifer (d) Ground water

2.____ is the term given to the top of the underground water saturated area.

(a) Ground water (c) Well water

(b) Water table (d) Spring

3. Water moves beneath the surface of the soil in a ______ manner.

(a) lateral (c) downward

(b) upward (d) eastward

4.____ is the term for zones of saturation in the ground where all area between soil or rock grain is filled with water.

(a) Water table (c) Well

(b) Lake (d) Ground water

5. Surface water is passed into the atmosphere by means of ______.

(a) transpiration (c) evaporation

(b) capillary action (d) gravity

6. The large area from which surface water is collected into reservoir is called a _______.

(a) water shed (c) lake

(b) aquifer (d) well

7. Ground water under natural pressure is called _______.

(a) hot water (c) well water

(b) pressed water (d) artesian water

8. Water is an aquifer ________.

   (a) moves at an extremely slow rate.

   (b) because it is under pressure moves very fast.

   (c) flows in a east to west direction.

   (d) is pulled downward by gravity.

9. The process by which water sinks into the soil surface is called ________.

   (a) evapotranspiration (c) transpiration

   (b) infiltration (d) surface runoff

10. Man threathens his supply of fresh water by ________.

   (a) taking too many baths

   (b) polluting water sources

   (c) building dams

   (d) planting too many trees

True or False

____11. The study of water management is called hydrology.

____12. An aquifer is an example of a surface water supply.

____13. The process by which vegetation transmits water into the atmosphere is called transpiration.

____14. Water is returned to earth by precipitation.

____15. The City of Savannah gets its fresh water supply from the Savannah River.

____16. Surface runoff occurs when water is not absorbed into the soil as fast as it falls or melts.

____17. An artesian well gives an unlimited supply of water.

____18. The hugh ditches in the Windsor Forest area are a flood control means to plan for excessive surface runoff.

____19. A spring occurs when the water table intersects the soil surface.

____20. The replenishment of underground water supplies by rainfall is extremely fast.

Microecology

Oatland Island Education Center

MICROECOLOGY: A DISCOVERY FIELD-OREINTED ACTIVITY

BY

CHARLES D. RICHARDSON

MICROECOLOGY: A DISCOVERY-ORIENTED FIELD ACTIVITY

PROBLEM AREAS:

Importance of small area relationships
Land use
Physical land features
Plant and animal relations

INTRODUCTION:

Before the actual field trip is to be taken, time should be devoted in class, to discuss the ecosystem. Students must understand the importance of the many relationships found in an ecosystem. The dependence of animals on plants, plants on physical land features, and lands' relation to change by animals is of basic need before a full understanding of a microecosystem can be achieved.

The students should attempt to define the term "microecology" as the relationships between living things and their environment when the environment is limited to an area approximately three square feet in area and six feet high.

The fact that most people never pay much attention to such small areas of the environment will make the introduction of this activity of great importance to the success of attaining the objectives. Creation of interest may be accomplished in many different ways. One such way may be to actually bring into the class a microecosystem (a one square foot area of grass covered soil) that has been populated with all sorts of plants and animals. The students need not be told why the microecosystem is in the room but should be given a few minutes each day, over a three or four day period, to observe the system.

Upon introducing the microecosystem concept, the teacher will need to introduce the equipment to be used for the field activity, as well as the methods to be used in studying the microecosystem.

PERFORMANCE OBJECTIVES:

This activity should give each student the ability to:

1. State some of the relationships within an ecosystem.
2. Identify some of the plant and animal life in a microecosystem.
3. Compare the microecosystem with the macroecosystem.
4. Explain how physical land features can determine what lives in that particular area.
5. Describe the various factors of a small area that relate directly to its' physical make-up.
6. Plot a graph of temperature and wind direction for an area of land.

PERFORMANCE OBJECTIVES: Continued

7. Determine wind direction and air temperature.

8. Draw a map of an area and give a key of the symbols used in the map.

9. Decide if plants are active, dormant, or dead.

10. Compare the data collected with other students data to see differences in microecosystems within the area.

PROCEDURES:

Students will be divided into groups of three or four. All records will be kept as a team effort. Upon arriving at the area to be studied, students should make an effort to find the most interesting plot (one with a dead fallen tree or stump, one with lichen-covered rocks, a certain kind of tree or perhaps a small puddle of water.

Steps to be taken upon choosing a plot:

1. Using string and small sticks, rope off an area approximately three feet by three feet.

2. Beginning upon arrival, measure the temperature of the ground and at three altitudes above the ground each thirty minutes. These temperatures will be plotted on a graph upon returning to the classroom.

3. Also at every half-hour interval, measure the wind direction, using the wind stakes provided (how to make wind stake is found in the materials list). Wind direction should be determined at ground level and at six to eight feet above the ground.

4. Make a map of your area showing all the significant items inside the string. A key should be included to identify all the symbols used on the map.

5. Record the evidence of any animal life within the plot. Include a count (if reasonable) of the actual individuals, as well as a count of the varieties present. An insect net may be used to catch organisms which move to fast to be counted and described. A record should also be made of any animal life that may have been in the area recently (snake skin, animal tracts, spider webs, and etc.). These animals and/or remains may be returned to class for naming.

PROCEDURE: Continued.

6. The plant life should be counted as to the different varities present as well as the number of each varity present. State if the plant is living or seems to be dead or dormant.

7. A study of the soil in the area should include noting the texture (fine, coarse, sandy, or other), color, compactness (depth to which a pencil can be inserted in a relatively bare patch), and pH (shake about one tablespoon of soil in a small container of distilled water, then test with Hydrion test paper. This paper is available from most chemistry teachers).

8. Upon returning to the classroom, students should complete the maps of their plot (color may be used if needed) and prepare the graphs of temperature and wind direction.

9. After all data has been completed, the groups should compare information and discuss the significance of their data. These are only a few of the questions that need to be answered:

   a. Were all wind directions the same in all the plots? If not, what are some possible causes for differences?

   b. Were temperatures significantly different in the ground and above the ground? Why or why not?

   c. Did all the animals found live in the same habitat? Possible reasons why or why not?

   d. Were the animals in each plot the same? Why were some animals not found in some of the plots?

   e. Of all the plants in your plot, were there any that seemed to be present in a much greater number than any other plant?

   f. Were there any plants present in any plot that seemed to be much different from all others? (color, size, etc.)

   g. Were the numbers of different kinds of plants/animals greater in any one plot?

   h. What were the most/least commonly found plant/animal in the plots?

MATERIALS NEEDED FOR EACH GROUP:

4 Stakes for marking off plot
15 Feet of string
4-6 Small bottles with caps
Wind stake - using a feather glued to a light weight stick, balance this on a pencil (eraser end) and stick a straight pen through the light weight stick into the eraser.
2 Thermometers - one may become broken testing the ground temperature.
Magnifying lense
Pencils and note paper
Small directional compass
Insect net - these nets can be made by using a circular clothes hanger with panty hose stretched around it.
Distilled water - small bottle for soil pH test.

FOLLOW UP ACTIVITIES:

1. Many areas of physical land make-up are available for study after this activity. One such study may be soil composition and texture, or the effect of animals on soil, or maybe a study of wind cause and effect on the land.

2. Animal/plant classification systems will be needed if an ecosystem were to be studied. Students may wish to learn the methods used to classify organisms.

3. Relationships between small ecosystems and large ecosystems may be of interest to many students. One such study may be the relation between a pond ecosystem and the overall area surrounding the pond. Animal and plant relations may also be of interest. An example of this is a study of why some birds will live only in an area where a certain grass grows.

4. Studies of different microecosystems (aquatic, for example) may be done in much the same way.

A Healthy Ecosystem and the Concept of Diversity

Oatland Island Education Center

A HEALTHY ECOSYSTEM AND THE CONCEPT OF DIVERSITY

BY

CHARLES D. RICHARDSON

A HEALTHY ECOSYSTEM AND THE CONCEPT OF DIVERSITY

PROBLEM AREAS:

Soil and water conservation
Water pollution
Land use and misuse
Population planning and control
Wildlife conservation

INTRODUCTION

In a healthy ecosystem there will be a very great number of different organisms. All the plants will not be same and all the animals will not be the same. No one species will dominate the community.

If, for any reason, part of the ecosystem comes under stress, the more sensitive and fragile organisms will leave the community or will be killed. The area under stress will then become less diverse in the different kinds of plants and animals. This loss of diversity is caused by the stress and can be measured.

From a few different methods of collection, counting and sorting, you will be able to arrive at a means of classifying an area as to its' degree of stress. This stress may be due to many factors or simply to one factor.

Several problems will be met in this study since the study is to be done without putting the area to be studied under more stress. It is, for example, impractical to collect large numbers of fish since this would be very disruptive to the ecosystem. Other problems will be met, but the overall concept of diversity and the healthy ecosystem will be clear.

PERFORMANCE OBJECTIVES:

Each student must be able to:

1. Build an artificial substrate for aquatic organisms.
2. Identify an exosystem under stress.
3. Write the measures needed to correct the stress.
4. Sort and count the different kinds of organisms collected.
5. Compare a healthy ecosystem with one under stress.
6. List most of the common names of organisms collected.
7. Plot on a graph the relation of the diversity of organisms in a healthy ecosystem with that of one under stress.

PERFORMANCE OBJECTIVES: Continued.

8. State why we need to know the areas under stress before the loss of diversity occurs.

9. Identify the major problems in land use in the community and propose solutions.

10. State the reasons for diversity in a healthy ecosystem.

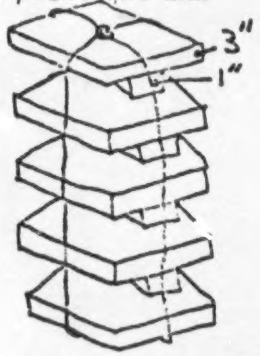
11. List many of the areas in the community that are not healthy ecosystems and why these areas are not healthy.

12. Collect, translate, and summarize data from the different methods of collection used in a diversity study.

PROCEDURE:

There will be three different methods of collection used in this study. Each method will be explained separately, as will the making of the collecting equipment needed for each study. We will be studying the diversity concept of a pond or lake (a stream may also be used) and a section of land around a foot path.

The aquatic substrate used in the study of the pond must be a type that will not damage the environment or the animals to be collected. The type we will use is called the Hester Dendy substrate and is very easy to build and use. It is cheap, reusable, almost indestructable, and for the kinds of organisms that come to live on it are very plentiful and removal does little harm to the ecosystem.



The materials needed:

a. 1/4" sheets of hardboard or marine masonite

b. 3/16" sheets of hardboard or marine masonite

c. Nylon string

How to make the sampler:

a. Cut 1/4" board into squares 1" on all sides (9 squares needed)

b. Cut 3/16" board into squares 3" on all sides (10 squares needed)

c. Drill 1/4" holes in the center of all squares

d. Assemble sampler by alternating 3" and 1" squares and tie assembly together using nylon string.

You may use less than 10 of the 3" squares per sampler but never less than 4. For any study using more than one sampler, be sure all the samplers are the same.

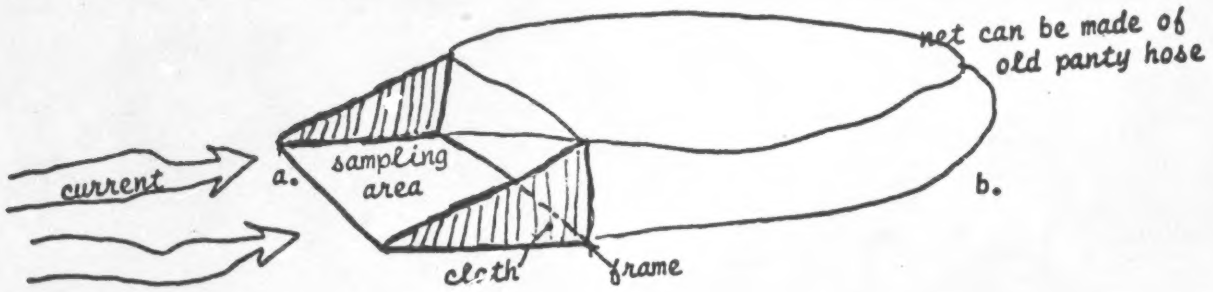
To use the sampler in a diversity study:

1. Choose sampling sites that are the same for each stream or pond if more than one sampler is used. The bottom material should be the same at each site. If a stream is used, the velocity of the water should be nearly the same.
2. Suspend the sampler from string or place on bottom at each site all in the same day.
3. Allow all samplers to reamin undisturbed in water for at lease two weeks. Then remove all the samplers the same day. Place each sampler in a plastic bag, tie, and bring them to place where they are to be counted. Keep the samplers cool during transport.
4. Disassemble each sampler. Scrape clean using a flat object that will not damage the organisms. Carefully wash all organisms into a large flat bottomed pan for counting and sorting.
5. Using a tweezer or an eyedropper, gently place each different kind of organism in a separate jar. Place a little pond water in the jar also.
6. Count each type of organism and record data. Use names of organisms you know.
7. You may keep all organisms for other people to use or for future reference. If you plan to keep these organisms, be sure to place them in alcohol. It may be wise to check the same area next year or even next month to see if the organisms change in great numbers.
8. If the organisms are to be kept, each jar must be labeled with date collected, amount of time sampler was in water, name of stream or pond, location of site where sampler was placed, and name of the person placing the sampler and doing the counting and sorting.

If a study of stream invertebrates is to be done, a surber net may be of great help. The net has two parts:

a. A horizontal frame outlining a one square foot area

b. A trailing net



To use the surber net for a diversity study in a stream:

1. The net is placed on a stream bottom in an area of fine gravel or pebbles.

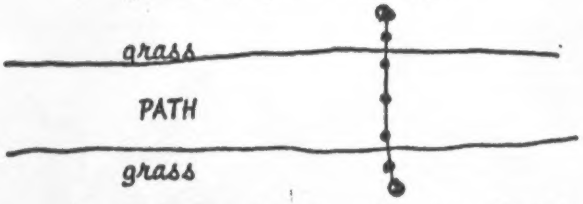
2. The net must be arranged with the mouth facing upstream so that the net cloth unfurls downstream.

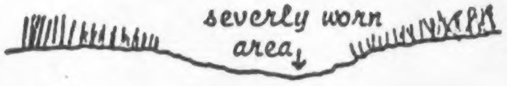
3. The one square foot of gravel within the sampling area is disturbed by hand, each large rock being lifted and rubbed. All parts of the sampling area must be mixed by hand. Organisms will be set free from the bottom material and be carried by the current into the net.

4. It is most common to take three samples at 1/4, 1/2, and 3/4 way across the stream at each sampling site. Organisms from each square foot sampled are placed in separate collecting jars and counted separately.

To study the diversity of ground organisms along a foot path very little equipment is needed. The concept of loss of diversity due to environmental stress is easily demonstrated by studying the effect of walking on a grass covered area. Most well worn foot paths have a severly worn area in the center and less worn areas on both sides. We will be studying a cross section of the path.

1. If you use a string with a knot each foot and use a couple of stakes to locate the string at right angles to the trail, you will have established a transect that you can use as a guide to your digging.





2. Make a circular digging tool by cutting the top and bottom from a tin can. Cut the can into two circular halves with tin snips or a saw. Place the sharp side of the can on the ground directly under the knot nearest one stake and press the can into the ground.

3. Use a garden trowel or spoon and dig out the soil inside the can. Dig out about four inches down. Sift out all the organisms and place in separate jars for later counting. Be sure to shake the roots of all plants over the strainer until all organisms are removed.

4. Repeat the procedure at the areas under all knots on the string. Be sure to label jars as to which knot the sample was taken. Make a note of how badly trampled the area was and also how many different kinds of plants were found in the spot. Replant any plants that were dug up in the sample.

5. Other jars may be used for the collection of the above ground insects found.

6. If more than one transect is made, a combining of the plant and animal date for each will give a more accurate record.

FOLLOW UP ACTIVITIES:

From all the information gathered in all the studies, many questions can be used to produce more interest and study. What can the students do to reduce the loss of diversity? Can the management of the area of the foot path replace the diversity? The areas of follow up are many. For those students interested in classification of crawlies, many organisms have been collected for them. Those students interested in a study of plants, a study of grasses used for different areas could be started. For the student that just enjoys being out side, more diversity study areas may be developed. A diversity study showing the comparision of organisms or plant growing under a pine tree and an oak tree. is another diversity study.

BOOKS OF INTEREST:

Bixby, William, A WORLD YOU CAN LIVE IN

Darling, Lois, A PLACE IN THE SUN

Dorst, Jean, BEFORE NATURE DIES

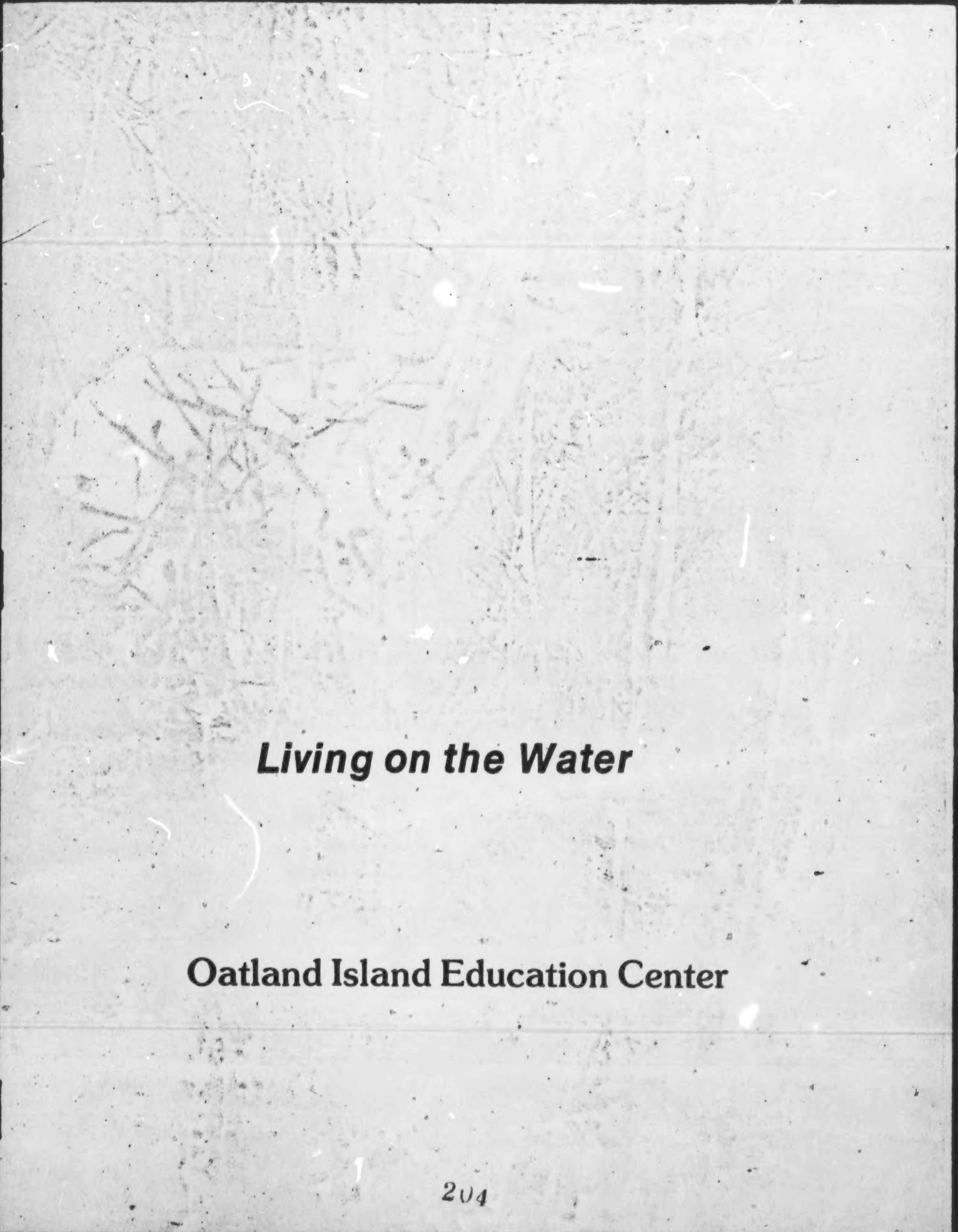
Warner, Matt, YOUR WORLD, YOUR SURVIVAL

FILMS OF INTEREST:

MAN AGAINST HIS ENVIRONMENT A look at the disappearing American wilderness
Time: 52 min.

THE NATIONAL ENVIRONMENT TEST Pollution of our environment
Time: 52 min.

SAY GOODBYE A report on plight of various animals facing extinction by man
Time: 52 min.



Living on the Water

Oatland Island Education Center

LIVING
ON
THE
WATER:
IT'S
ENVIRONMENTAL
IMPACT

By

Eleanor Hendry

Cindy Smith

Pam Young

INTRODUCTION:

What is the environment? To many people the environment is the air, the water, and the forest and its wildlife. Of course each of these are a part of the environment, but the real answer to the questions goes much further than the air, the water, and the forest. In essence, we can truthfully state that our environment is a summation of all things that affect our daily lives.

This unit has been designed to demonstrate how just a single environmental component can greatly influence the history, growth, and economic development of a community. It is believed that by completing the activities presented in this packet, your students will develop a greater awareness of how the City of Savannah has been effected by its surrounding waterways.

Savannah has throughout its history been profoundly affected by its adjacent waterways. Even the selection of a site for the founding of the original settlement was influenced by a waterway. The site selected by General James Oglethorpe was a high bluff that overlooked the Savannah River.

One of the underlying reasons for his choice was that the natural bluff and its adjacent deep water gave the settlement excellent port facilities. From that time on, the city has continued to be influenced by its waterways. Today, the choice of jobs available to the community has increased because of the waterways. And besides the economic assets, our local waterways also provides the community with recreational and aesthetic values that are beyond monetary expression.

In order to demonstrate the above mentioned concepts, a series of activities have been developed. These activities are contained within this unit and they should fulfill the stated objectives. However, the teacher, at all times, should feel free to modify or adapt any activity to best suit the needs of the individual class.

OBJECTIVES:

Given the experience of having completed the activities presented in this packet, the student will:

1. Explain why the site chosen for the City of Savannah has become an asset to the community.
2. Identify businesses that are directly related to the waterways.
3. State the importance of the inland waterway.
4. List careers directly related to the waterways.
5. List food sources derived from our waterways.
6. Explain the difference between fresh water rivers and estuarine rivers.
7. List recreational activities related to the water.
8. State the importance of the waterways to the development of the early settlement.
9. Explain the relationships between the salt marshes and marine food resources.
10. State the economic importance of the port to the City of Savannah.

TOPIC A: The Founding Of Savannah

I. Discussion of the early settlement:

- a. Sample aspects to consider.
  1. Political, Religious, sociological reasons for establishing the colony of Georgia.
  2. Voyage to the New World.
  3. Choosing the proper site for the town.
  4. The development of the port facilities.
- b. Sample questions to consider.
  1. What was the Anne?
  2. What navigation instruments were used on the ships in and around 1733?
  3. What cargo was carried aboard the Anne?
  4. What did Oglethorpe see along the river that made him decide on the site for a settlement?
  5. What advantages for growth - as a port - did the bluff area give rather than Tybee or 10 miles further up the river?

II. Related activities:

- a. Have students complete the following activities.
  1. Trace the route of the Anne from England to the New World. Include a legend, scale of miles and cardinal directions. Identify major features - land and water.
  2. Prepare a short play. Have one student act as Olgethorpe and explain why he thought Savannah was a good place for a settlement.
  3. Field trips.

      a. Ships of the Science Museum.
      b. Tour of Savannah's Waterfront.
   b. Sample questions related to activities.
      1. What is the distance in miles from Savannah, Ga. to London England?
      2. Did Oglethorpe and the colonists travel non-stop from England to Savannah?
      3. Resources.
         a. Colony of Georgia.
         b. The Savannah.

****

TOPIC B: Early Communities Located Near Savannah

I. Discussion of the founding and decline of communities located near Savannah:
   a. Listing of settlements that can be used for comparative studies.
      1. Ebenezer
      2. Sunbury
      3. Hardwicke
   b. Sample questions to consider:
      1. Were these settlements located on waterways?
      2. By what groups of people and/or nationalities were these settlements failed?

II. Related Activities:
   a. Have students complete the following:
      1. Compare the physical location of the above communities to that of Savannah.

2. Locate the above settlements on a map.
3. Research the founding and decline of one or more of the settlements.

b. Sample questions to consider.
1. On what waterways were the early communities located?
2. How do these waterways compare to the Savannah River?
3. Of what importance were the waterways to the communities?

III. Resources:

a. Georgia (Ebenezer) p.55, pp. 63-64.
b. Georgia Journeys (Ebenezer) p. 59-62.
c. Georgia's Land Of The Golden Isle (Sunbury) p. 28-43.
d. Savannah News Press July 4, 1976 p. 1B.

****

TOPIC C: Growth Of The Area

I. Discussion of the growth of Savannah:

a. Sample aspects to consider.
1. Direction of growth.
2. Development of population areas.
3. Relationship between waterways and the development of population areas.

b. Sample questions to consider.
1. What is the coastal plain?
2. How could the geographic location of Savannah, pose a problem for growth?
3. How did the local waterways influence the growth of Savannah and the development of population areas?

4. Have population areas changed since the 1800's?
5. How do population areas on the water contribute to the good of the community?

II. Related Activities:

a. Have students complete the following activities.

1. Invite resource people such as builders, realtors, and city planners to your class. Discuss how the local waterways influence their profession.
2. Investigate some of the population areas such as Thunderbolt, Garden City, Wilmington Island, Isle of Hope.
3. Dtermine how the local waterways affetced the development of the above communities.

b. Sample questions to consider.

1. What is the economic affect of the waterways on a population area such as Thunderbolt?
2. What building codes are enforced due to local waterways?
3. How do population areas affect their local waterways.

III. Resources:

a. Georgia (Thunderbolt) p. 52.

b. Corps of Engineers (100 years flood plain).

****

TOPIC D: The Waterways

I. Discussion of the major waterways near Savannah:

a. Listing of important waterways.

1. Savannah River
2. Ogeechee River

        3. Intercoastal Waterway (Salt Water Rivers)
    b. Sample questions to consider.
        1. Where is the source of the Savannah River?
        2. How do our salt waters river differ from the Savannah and the Ogeechee Rivers?
        3. What is the source of the salt waters rivers?
        4. Of what economic importance is the Intercoastal Waterway?

II. Related Activities:
    a. Have students complete the following activities.
        1. Make a map of the important waterways. Include legend, cardinal directions and major features - land and water.
        2. Invite a licensed boater to class and have him explain nautical charts and navigation instruments and how these are used.
        3. On a nautical chart trace a route from one island to another going through at least two rivers. Compute the distance traveled in nautical miles.
        4. Compare the monetary value of the waterfront property to that of comparable size section of inland property.
    b. Sample questions to consider.
        1. What is the purpose of a nautical chart?
        2. What orginization developes nautical charts?
        3. Land speed is calculated in mph, in what terms is the speed of a ship calculated?
        4. What navigation instruments are used in modern boats and ships?

III. Resources:

- a. 1001 Questions About Water.
- b. The Rivers Journey.
- c. The Savannah.
- d. The True Book Of Rivers About Rivers.

****

TOPIC E: Economic Effect Of Waterways

I. Discussion of the industries that utilize the local waterways:

- a. Partial listing of industries and/or companies.
  - 1. Industrial/Manufacturing
    - a. Union Camp
    - b. American Cyanamid
    - c. Sugar Refinery
    - d. Continental Can
  - 2. Importing/Exporting
    - a. Strachan
    - b. Stevens
  - 3. Petroleum Companies
    - a. Southland Oil
    - b. Standard Oil
    - c. American Oil
    - d. Gulf Oil
- b. Sample questions to consider:
  - 1. Are any of these companies located on a major waterway? (If yes then explain the reasons for the choice of location).
  - 2. What part, if any, does water play in the actual making of the product?

3. Are waterways used in importing and exporting?
4. Are there any manufacturing processes that adversely effect local waterways?

II. Related Activities:

a. Have students complete the following activities.
   1. Select a product made in Savannah. Make a display tracing the product from raw material to finished product. (For example, a tree to a paperbag).
   2. Have a representatives of major industries come and talk with the class about the part water plays in their particular industry.
   3. On a world map, locate the various countries that utilize Savannah as a port.
   4. Make a display of the flags of the countries represented.
   5. Make a mural of shipping vessels used from the colonial thru today.

b. Sample questions related to activities.
   1. How many foreign ships call on the port each year?
   2. What are some of the manufactured products that are distributed through the port facilities?
   3. How are these products transported from Savannah?

III. Resources:

a. Cargo Ships

b. The Ship Builders From Clipper To Submarines To Hovercraft.

c. Ships

TOPIC F: Marine Food Resources And Related Businesses

I. Discussion of Food Resources that are harvested in Local Waterways.

a. Listing of food resources:
   1. Shrimp
   2. Crab
   3. Fish

b. Listing of related businesses:
   1. Commercial Shrimping
   2. Commercial Fishing
   3. Commercial Crabing
   4. Packing Plants
   5. Seafood Restaurants

c. Sample questions to consider:
   1. What is the economic impact of the seafood industry on the local community?
   2. Which of the marine food resources is the most valuable?
   3. Are there specific seasons for the harvesting of seafood?
   4. What organization establishes standards for the harvesting of seafood?
   5. Are there any marine organisms harvested for purposes other than food?
   6. Has there been a decrease in the number of individuals employed by the seafood industry in the past 20 years?
   7. What effect has excess fishing had on the local marine - food resource?

8. Are there any kinds of special equipment used in the harvesting of marine food resource?

II. Related Activities:

a. Have students complete the following activities.
   1. Investigate the relationship between salt marshes and life cycle of shrimp and other marine organisms.
   2. Visit the docks at Thunderbolt and observe the shrimp boats being unloaded. Talk with a fisherman and, if possible, go aboard the boat to see what equipment is used.
   3. Visit Ambos to observe the packing process of the seafood caught in and around the area. (Contact Mr. Ambos, 352-2497).

b. Sample questions related to activities:
   1. What percent of the total seafood, harvested in the Savannah area, is consumed locally?
   2. To what areas are locally caught seafood shipped?
   3. What mode of transportation is used for shipping?
   4. What would happen to the local seafood industry if all the salt marshes were destroyed?

III. Resources:

a. Early American Boats

b. Remarkable Creatures Of The Seas

c. Life And Death Of A Salt Marsh

TOPIC G: The Waterways As A Source Of Recreation

I. Discussion of Recreational activities related to the waterways:

- a. Listing of Recreational Activities:
    1. Water Skiing
    2. Swimming
    3. Sport Fishing
    4. Crabbing
    5. Boating
- b. Sample questions to consider:
    1. Are there any local businesses that cater strickly to the recreational public?
    2. Does the local government promote recreational activities?
    3. Are there any State regulations that control recreational activities?
    4. What is the Department of Natural Resources and what function does it perform?

II. Related Activities:

- a. Have students complete the following activities:
    1. Make a travel poster that would depict the water related recreational activities available in the Savannah area.
    2. Have students bring in pictures of their families in water-related recreational activities and make a pictorial display of aquatic recreational activities.
    3. Invite a respresentative from a sporting goods store to your class and discuss the economic impact of aquatic recreational activities.
    4. Have students prepare a plan for the use and development of the waterways as area for recreation.

b. Sample questions related to activities:

1. How many people use the waterways for recreation?
2. How does the local recreational activities differ from those in the North Georgia counties?

****

TOPIC H: Careers

I. Discussion of career opportunities that are waterways related:

a. Civilian Careers:

1. Marine Scientist
2. Boat Pilots
3. Fishery Careers
4. Longshoremen

b. Government:

1. Coast Guard
2. Customs Agents
3. U.S. Corps of Engineers
4. Savannah Ports Authority
5. Georgia Ports Authority

c. Sample questions to consider:

1. How does marine scientific researh help the entire community of Savannah?
2. How does an individual become a river boat pilot?
3. What are the duties of a river boat pilot?
4. What are some of the areas of responsibilities of the U.S. Corps of Engineers?

5. What are the duties of the Coast Guard?
6. To what branch of government does the U.S. Customs Agency belong?
7. What is the function of the Georgia Ports Authority?
8. If you wanted to apply for a job with the U.S. Customs Agency, how would you do it?

II. Related Activities:

a. Have students complete the following activities:
   1. Invite a representative of a major shipping company to your class for a discussion of the various aspects of the importing/exporting businesses.
   2. Make a list of goods that are imported through the local port facilities.
   3. Calculate the amount of Duty paid on some of the imported goods.
   4. Let each student select a job that interest he or she and have each research the duties and responsibilities of that particular job.
   5. Invite a resource person from one of the government agencies to discuss the responsibilities of a particular agency.

b. Sample questions related to activities:
   1. How are imported goods transported out of Savannah?
   2. What organization is responsible for the collection of Duty?

c. Culminating Extension Activities:
   1. Making a scrapebook to illustrate the benefits of living on the water. Include industries, careers, food, and recreation.

2. Present a play in which several students stress the benefits of the waterways in trying to persuade others that Savannah is a good place to live. In the play stress the economic opportunities, food sources, and recreation available.
3. Investigate the salt marsh and its effects on the food sources such as shrimp and oysters.
4. Investigate the industries on the Savannah River and the extent to which they pollute the river. List the methods they are using to reduce pollution.

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LISTING OF RESOUCE PEOPLE:

1.	Ambos Seafood Packing	Contact: Mr. Ambos 352-2497
2.	Coast Guard	Contact: Chief William 786-2497

3.	Corps of Engineers	Contact:	Virginia Kauble 233-8822
4.	Customs	Contact:	Mrs. Marion F. Baker 232-4321
5.	Georgia Ports Authority	Contact:	Mr. Jim Bisson 964-1721
6.	Historic Tour of Savannah	Contact:	Mrs. Betty Rauers
7.	Licensed Boater	Contact:	Mr. Lawrence Mayer
8.	Oatland Island Education Center	Contact:	Mr. E. Anthony Cope 897-3773
9.	Savannah Ports Authority	Contact:	Mr. Sanford Ulmer 233-9604
10.	Skidway Institute - Marine Extension Center	Contact:	Mr. Will Hon 352-1631
11.	Sugar Refinery	Contact:	Ms. Betty Miller 234-1261
12.	Union Camp	Contact:	Mr. Dana Oliver 236-5771

MAPS:

1. Savannah Public Library Reference Room
2. Encyclopedia (under Georgia)
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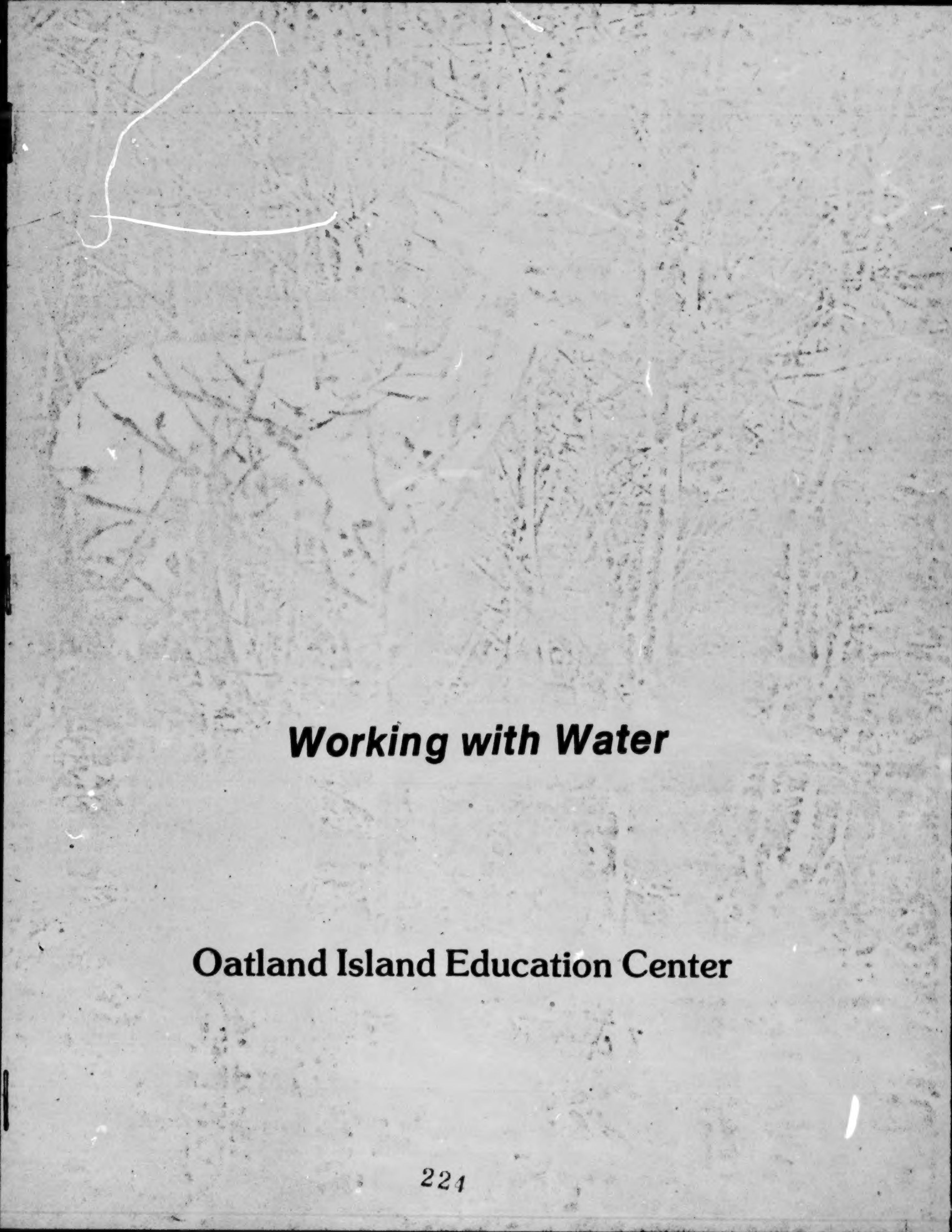

Working with Water

Oatland Island Education Center

WORKING

WITH

WATER

BY

SHARON R. MITCHELL

INTRODUCTION:

All living things require water. It is a natural resource which is most abundant now, but people need to realize what is happening to the quality of their water. Students need to learn how to recognize and deal with problems of water pollution.

The following activities have been designed to help students gain a broader knowledge of water pollution.

PERFORMANCE OBJECTIVES:

1. Define "Water Pollution".
2. Describe the effects of water pollution on living organisms.
3. Recognize ways of helping to control pollution.
4. List several causes of water pollution.

****

ACTIVITY I: Testing For Pollution

BACKGROUND:

Activities I and II require water samples from various areas in your environment. A field trip could be taken to collect these samples or students could be asked to bring in samples from particular areas. Save samples from activity I to use in activity II.

MATERIALS:

1. Water samples from different areas.
2. White paper.
3. Magnifying glass
4. Quart jars
5. Paper and pencil for labeling

PROCEDURE:

1. Using several quart jars, collect water samples from areas near your home or school (lakes, rain puddles, ditches, oceans, ponds, and faucets.)
2. Label each jar as to where it came from and date it was collected.
3. Bring the samples to class and test for clarity, color, smell, and debris. Your observations will answer most of the questions.

To Test For Clarity - Hold a piece of white paper with a dark line on it behind each sample. If the line is blurred and fuzzy, the water is not clear and could possible be polluted.

To Test For Color - Note and record whether or not the samples are colored.

To Test For Odor - Smell each sample. Check for the smell of sulfur (rotten egg odor). If there are odors are they strong are weak? Try to determine what causes the odor.

To Test For Debris - Observe each sample in front of a strong light. Do you notice any particles floating around? Examine a few drops under a microscope or magnifying glass.

4. Make a chart of your findings to display in your room.

PLACE & DATE COLLECTED	CLARITY	COLOR	ODOR	DEBRIS	REMARKS
1.					
2.					
3.					
4.					
5.					

QUESTIONS:

1. What do your findings tell you?
2. Where was the most polluted water found?
3. Where was the least polluted water found?
4. What caused the pollution in each sample?

****

ACTIVITY 2: Bacterial Growth

MATERIALS:

1 or 2 boiled potatoes (sliced).

Water samples from various areas including tap water.

Quart jars with lids (as many as there are samples).

1. Place a slice of warm potato in each dry, clean jar. Add enough water from one sample being tested to cover the bottom of the jar but not the potato.
2. Follow the same procedure for each of your water samples, including one for tap water.
3. Cover the jars and place in a warm, dark place for a few days.
4. Observe and note the quantity of growth of bacteria on each potato slice.

NOTE:

The potato is a substance on which many types of bacteria can grow. Bacteria grow best without light at warm temperatures. The tap water should not show any bacteria growth.

Some will have a slight growth and some will show more. This test should indicate which water samples came from the most polluted areas.

5. Scrape off a portion of growth on each sample potato and examine under a microscope. Do you see bacteria of different shapes in the various samples?
6. Make a graph or chart demonstrating the growth rate of the various samples.

****

ACTIVITY 3: Substances In Water

MATERIALS:

One teaspoonful of the following:

1. Salt
2. Sugar
3. Fertilizer
4. Food coloring
5. Tap water
6. Soil
7. Oil
8. Detergent
9. Ammonia
10. Containers for each substance.

1. Display each container of tap water to which one or two spoonfuls of each substance has been added. Mix each substance in the tap water; some substances will not mix well, if at all.
2. Observe, smell, and in some cases, taste each sample. The teacher should specify which samples may be tasted.

QUESTIONS:

1. Which of the materials are visible in the water?

2. Which substances are fit for drinking?
3. Which ones could support plant or animal life?
4. Which ones would be conducive to swimming or fishing?
5. How much of each substance would it take before you would consider it polluted? One teaspoonful? Two?

****

ACTIVITY 4: Getting Rid Of Pollutants

MATERIALS:

1. Contaminated water
2. Microscope
3. Bleach
4. Hot plate
5. Paper towels or other materials suitable for a filter.

1. Place a few drops of the contaminated water on a slide under a microscope.
   Notice the bacteria living in it.
2. Place a drop of bleach on the slide. Place it back under the microscope.
   Notice what happened to the bacteria.

NOTE: Bleach contains chlorine which destroys many types of bacteria.

3. Boil some of the contaminated water and re-examine it under the microscope.
   What has happened to the bacteria?
4. Fold a paper towel into quarters and make into a cone-shaped funnel. Pour some of the contaminated water through this

filter. Observe the paper towel and see what has been filtered. (Sand and Gravel are also good filters.)

5. Allow a glass of the contaminated water to stand for 24 hours. Notice how contaminants settle to the bottom.

****

ACTIVITY 4: Become A Water Detective and Pollution Controller

MATERIALS:

Paper and pencil for recording information.

Scrapbook.

1. Collect samples from the waterways near your home or school and examine them using the activities described in this packet.
2. Try to determine where pollutants are coming from. Is it from factories, boats, careless people, sewage, or what? Make a written record of your findings.
3. Keep a scrapbook of newspaper articles each day dealing with pollution. Include any booklets, or phamplets, from governmental agencies and private organizations fighting pollution.
4. Find out about the pollution control agencies in your area and use the information you have collected to help them fight aganist pollution.

EXPANSION ACTIVITIES:

1. Form an anti-pollution club. Explore different water areas, and let your findings be known to those who can do something about it. Contact your local newspaper for publicity on the subject if you need it.

2. Tour the Water Treatment Plant.
3. Discuss why distilled water is preferred for use in steam irons.

****

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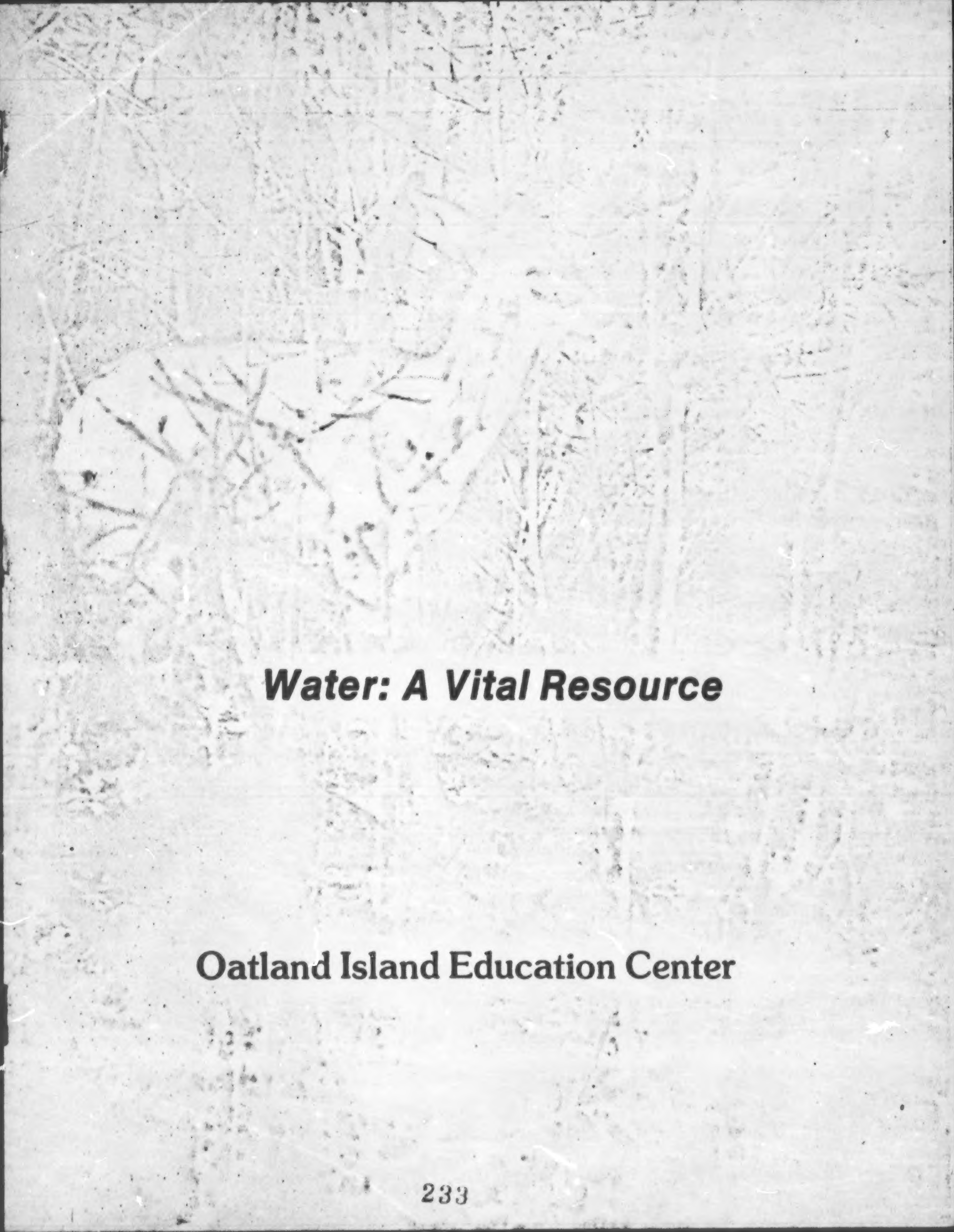
PLACES:

Water Treatment Plant

Pollution Abatement Plant



Water: A Vital Resource

Oatland Island Education Center

WATER:

A VITAL RESOURCE

By

Delores J. Washington

INTRODUCTION:

Water is probably the most important liquid in the world and is so easy to obtain that some people seldom give any thought to how necessary it is to the lives of man, animals and plants. The bodies of most living organisims contain more water than any other substance and without it, they would die. Besides being necessary for life, water has many uses. People use the water of springs, wells, rivers and seas. In our homes, it is used for washing clothes and dishes, preparing meals, and for removing waste. Water is also used in irrigation practices. industrial processes, fire-fighting, street-cleaning and for recreation.

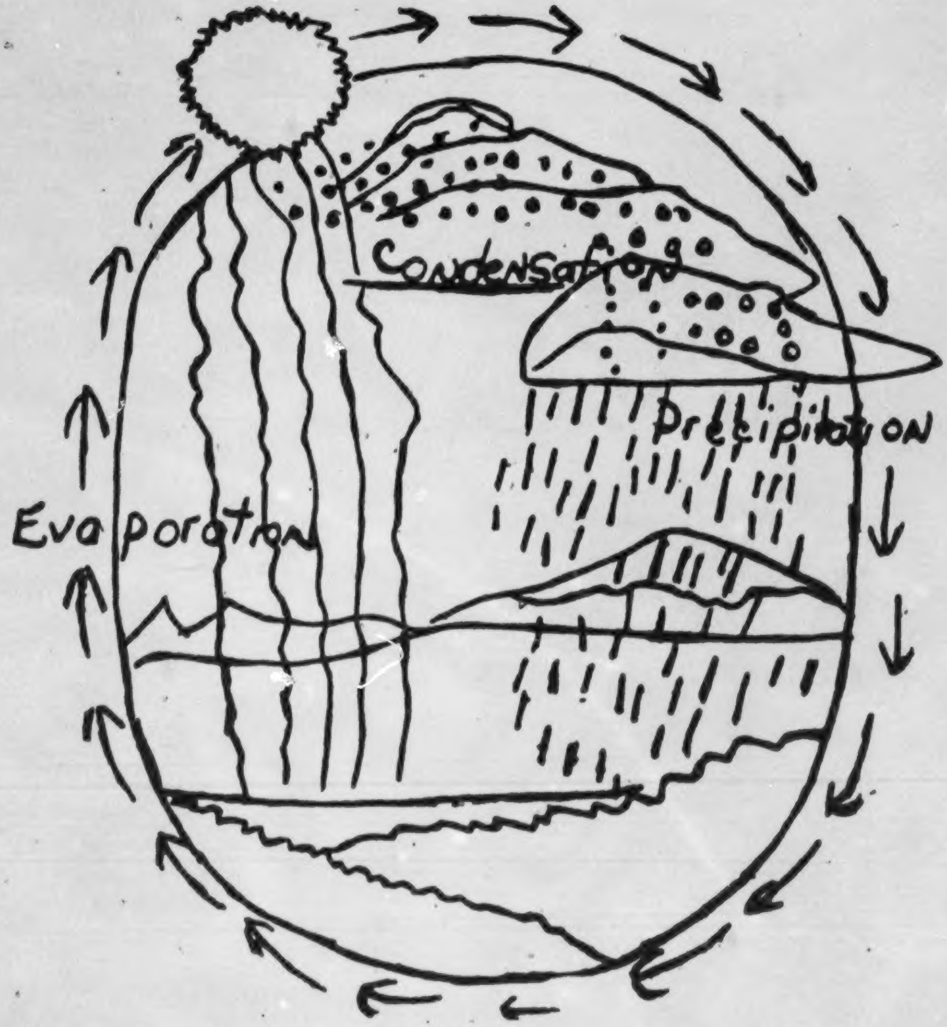
The activities contained in this packet have been designed to provide students with basic information concerning water cycles and filtration system.

PERFORMANCE OBJECTIVES:

Upon completion of these activities, the students will be able to:

1. Discuss the uses of water.
2. Define evaporation, condensation and precipitation.
3. Discuss the water cycle.
4. Construct water filtration system.
5. List the steps in filtering water.

THE WATER CYCLE


Condensation
Precipitation
Evaporation

The water cycle is an endless circulation system. We can think of the cycle as beginning with the ocean. Water from the surface of the ocean evaporates into the atmosphere, in the form of water vapor. Eventually, the water vapor is condensed once this occured, some of the precipitation run off the surface to streams and or rivers, eventually returning to the ocean. Some of the water soaks into the ground.

As more and more water sinks into the ground, it begins to collect above the bedrock or dense soils. When the ground has as much water as it can hold, the ground becomes saturated forming what is known as the water table. After heavy rains, the table is nearer the surface. In dry weather it drops again as the ground water is used up.

ACTIVITY I: How Does Water Get Into The Air?

MATERIALS:

1. Saucer
2. Water glass
3. Footed test tube

PROCEDURE:

1. Put three tablespoons of water in each container.
2. Place them side by side and let them stand.
3. Examine them periodically.
4. Notice and record what happens.

QUESTIONS:

1. What happened to the water?
2. From which of the containers did it disappear first?
3. From which container did it disappear last? Why?
4. What is this process called?
5. Can you recall other places where this process has taken place?

ACTIVITY 2: Demonstration Of Water Vapor In The Air.

BACKGROUND:

There is always a certain amount of water vapor in the air; a measurement of the amount is expressed as Humidity. This activity has been designed to demonstrate how the humidity or water vapor is condensed, forming a precipitation. Water vapor strikes the cold side of jars and bind together forming water droplets. In nature, dew forms in the same manner. Water vapor becomes liquid water when it strikes a cold object such as a blade of grass. This is why dew is found on the grass early in the morning. When the sun rises, the dew evaporates and turns to vapor.

MATERIALS:

1. Jar
2. Ice cubes
3. Water

PROCEDURE:

1. Pack ice cube into jar.
2. Fill with water.
3. Cover the jar and let it stand.
4. Observe the outside of the jar.

QUESTIONS:

1. What forms on the outside of the jar?
2. Where did it come from?
3. What explanation can you give for this?

ACTIVITY 3: Homemade Rain Cloud

BACKGROUND:

Scientists have not yet mastered rain-making on a large scale but are still experimenting. They believe that within a few years they will know how to produce large rain clouds. This experiment demonstrates how rain clouds are formed.

MATERIALS:

1. Teakettle
2. Hot plate
3. Jar

PROCEDURE:

1. Bring the water in the kettle to a boil.
2. Hold a jar, mouth downward, over the spout of the kettle.
3. Can you explain now how rain is made?

****

ACTIVITY 4: Filtration System

BACKGROUND:

Some cities obtain water by pumping it from a lake, a river or a well. Before the water can be used by humans, it must be purified. This is done by allowing it to trickle through such materials as fine sand and charcoal. Microbes and fine sediment cling to the sand grains as the water passes through the filter materials. The following is a demonstration of how A Filtration System functions.

MATERIALS:

1. Glass tubing (15 cm)
2. Open end glass cyclinder
3. Rubber stopper (5 cm)
4. Stand
5. Clamp
6. Coarse gravel
7. Fine gravel
8. Sand

PROCEDURE:

1. Moisten the glass tubing and insert it into the rubber stopper.
2. Fit the stopper into the bottom of the glass cyclinder.
3. Support the cyclinder, open end upward, with the stand and clamp.
4. Add a layer of coarse gravel, a layer of fine gravel and a layer of sand to the cyclinder.
5. Slowly pour muddy water into the cyclinder.
6. Collect the water in a beaker under the tower.

QUESTIONS:

1. What happened to the muddy water?
2. Has the bacteria been killed in the process?
3. What substances can be used to purify the water?
4. Why is purfication important to Public Health?
5. Do you know the source of the water you use at home?
6. Is your water purified before you use it? After you use it?
7. Do you know where the water is purified?
8. Do you know how the water you use re-enters the natural water cycle?

EXPANDED ACTIVITIES:

1. Schedule a field trip to the Industrial and Domestic Water Treatment Plant.
2. Research and draw a model of an artesian well.
3. Schedule a field trip to the Sewage Treatment Plant on President Street to see how waste water is treated.

****

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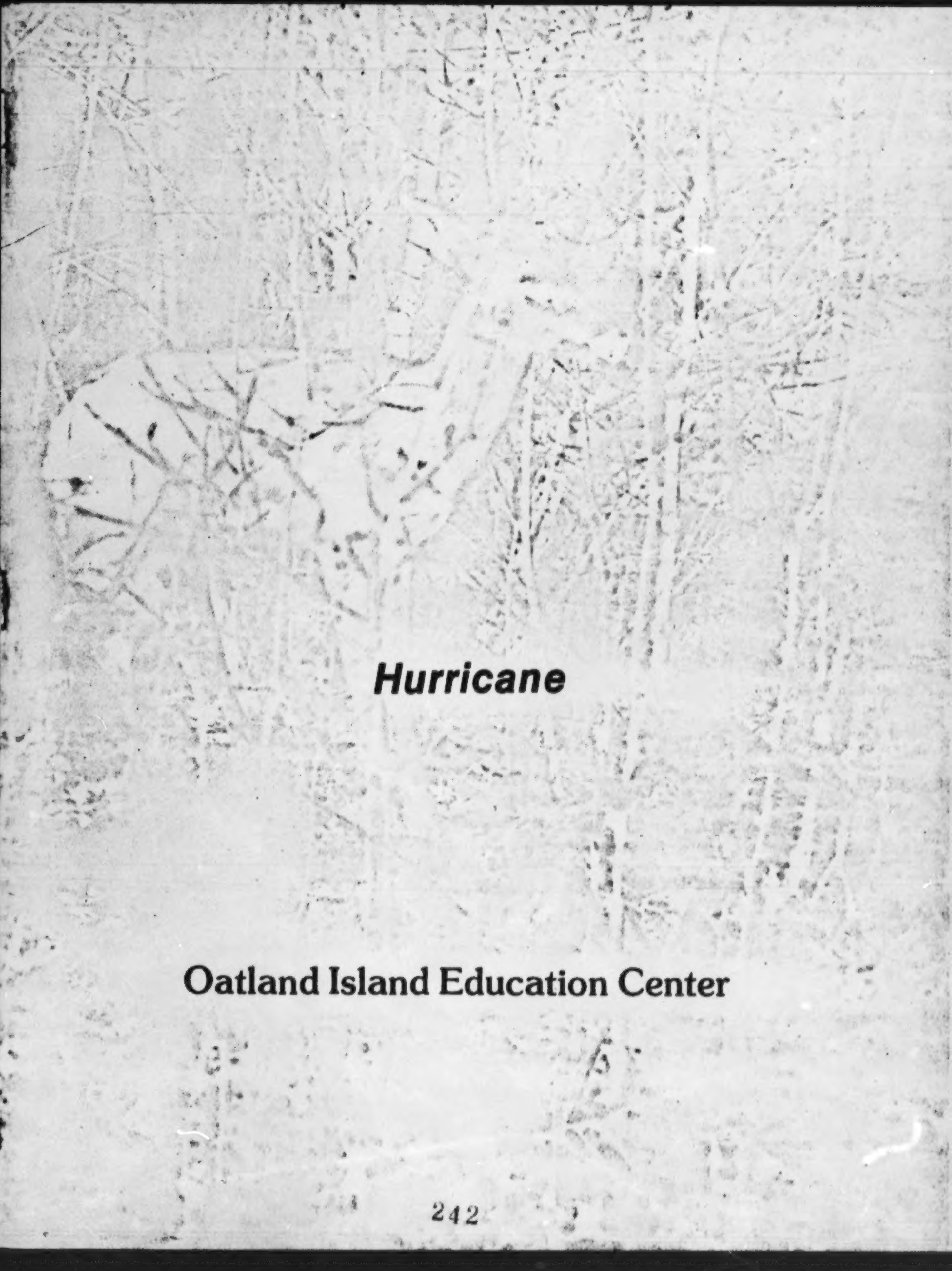

Hurricane

Oatland Island Education Center

HURRICANES - A THREAT TO OUR ENVIRONMENT

by

Melissa A. Wells

INTRODUCTION:

The residents of coastal Georgia live in an environment that has been, and can be, threatened by hurricanes. At any time, cities located on the Georgia coast can be devastated by a hurricane, causing millions of dollars of property damage and injuring many of its inhabitants. Because of this, residents of all coastal environments need to know more about hurricanes and the precautions that need to be taken when a hurricane warning is issued.

This packet has been designed to teach students about hurricanes, giving them a background of pertinent information concerning hurricanes and how they can pose a threat to our local environment.

OBJECTIVES:

Upon completion of the activities given in this packet, a student will be able to:

1. Explain the origin of hurricanes.
2. Define hurricane season.
3. Demonstrate direction of hurricanes' winds in the northern hemisphere.
4. Define eye of a hurricane.
5. Draw a hurricane on a weather map.
6. Exemplify hurricane tracking.
7. Explain the difference between a hurricane watch and a hurricane warning.
8. Describe functions of weather bureau in forecasting hurricanes.
9. Explain the system for naming hurricanes.
10. Draw a hurricane flag.
11. List safety measures and precautions needed to be taken when a hurricane warning is issued.

12. Discuss duties of local and national agencies involved in offering aid and information during a hurricane.

13. Describe the ways the local environment would contribute to problems during a hurricane.

14. List precautions to be taken if a tornado is spawned by a hurricane.

15. Outline a history of hurricanes which have struck Savannah.

16. Explain two reasons a hurricane dissipates.

ACTIVITY 1: Classroom Demonstration of a Storm

MATERIALS:

Water

Teapot

Potholder

Electric Hotplate

REFERENCE:

Hurricanes and Twisters; Robert Irving, pp. 51-54.

FILMS:

"Wind at Work"

PROCEDURE:

Place the teapot on the hotplate and bring the water to a boil. Once this has occured, some of the water will be converted to steam, which will then evaporate. As the steam rises it warms and mixes with the air. It is in a simillar manner that a hurricane is formed over an ocean. It begins when the sun warms a small section of sea water. The heated water, just as in the teapot, begins to evaporate, wetting the air above the ocean. If this process continues for an extended period of time, clouds will form and possible grow into a hurricane.

ACTIVITY 2: Flashlight Experiment

MATERIALS:

Flashlight

Globe

REFERENCE:

Hurricanes and Twisters; Irving, Robert

Sunshine Makes the Seasons; Branely, Franklin

PROCEDURE:

Your students have learned, from the teapot storm, that hurricanes form where the sea is the warmest, and it is the sun that heats the sea water. Locate the equator on a globe, along this line the sea is the warmest. To demonstrate why, pretend the flashlight is the sun and direct a beam of light from the flashlight onto the equatorial line. (A demonstration of this can be found on page 58 of Hurricanes and Twisters - Fig. A).

The flashlight beam strikes the globe in a manner comparable to the way the sunlight strikes the earth during the spring and fall seasons. During these seasons, the sun is directly over the equatorial area and it receives a majority of sunlight. After completing this, following the instructions given in Fig. B, and C, pages 58 and 59 of Hurricanes and Twisters. These activities demonstrates the manner in which sunlight strikes the earth on June 21st and December 21st, respectively.

The above activities demonstrate that the strongest sunlight moves back and forth, but the sun remains in a narrow belt above the equator. Because of this, the sea water is warmer in the equatorial regions, making it a prime area for the development of hurricanes.

ACTIVITY 3: Demonstration of Hurricane Wind Direction

MATERIALS:

A spinning top

REFERENCE:

Hurricanes and Twisters; Irving, Robert

Encyclopedia Americana

PROCEDURE:

Hurricanes are made of moving winds. The air in the hurricane spins like a top. Research in Encyclopedia Americana and Hurricanes and Twisters the way in which hurricane winds in the northern hemisphere turn. Show this direction by spinning the top. Also, draw the winds' direction using arrows on paper and label it "Hurricane Winds' Direction in Northern Hemisphere".

In same manner show the wind direction of a hurricane in the Southern Hemisphere. Label the directions as "Hurricane Winds' Direction in Southern Hemisphere".

After completing these activities, present to the class the following question.

Which hemisphere is Savannah located?

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ACTIVITY 4: The Eye of a Hurricane

MATERIALS:

None

REFERENCE:

Storms - From the Inside Out; Weiss, Malcolm.

Hurricanes and Twisters; Irving, Robert.

1001 Questions Answered About Storms; Tufty, Barbara.

Storms and Man; Ross, Frank.

PROCEDURE:

Have the students read any of the above references and answer the following questions.

1. What is the eye of a hurricane?
2. How high is the eye?
3. What occurs at the eye?
4. Is the air pressure low or high in the eye?
5. How can you find the direction of the eye of the hurricane?
6. Why can the eye of the storm be dangerous?
7. What should people do as the eye passes over?

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ACTIVITY 5: Weather Map

MATERIALS:

Map of the United States

Marking pen

REFERENCE:

Hurricanes and Twisters; Irving, Robert.

FILM:

"Story of Hurricanes"

PROCEDURE:

Look on page 75 of Hurricanes and Twisters. This is what a hurricane looks like on a weather map. The lines on the map are called isobars. All the places on one line have the same air pressure at ground level. The air pressure is lowest in the center of the smallest circle. This is the eye of the hurricane. Have your students draw on a map of the U.S. several isobars, each showing an imaginary hurricane. View the film "Story of Hurricanes" for additional information on how hurricanes are charted.

ACTIVITY 6: Tracking Chart

MATERIALS:

Envelope

Paper

Fifteen cents

Stamp

REFERENCE:

Hurricanes - Monster Storms From the Sea; Brindze, Ruth.

FILMS:

"Understanding Storms"

"Operation Hurricane"

PROCEDURE:

A tracking chart is used by the Weather Bureau to monitor the movement of hurricanes. These charts are available by writing to:

Government Printing Office
Washington, D.C. 20402
Cost - 15¢

Invite a representative from the local Weather Stations to your class and have them demonstrate how tracking charts are used.

EXTENTION:

Schedule a field trip to the Weather Bureau at Travis Field. Have the Bureau staff demonstrate how hurricanes are tracked and how tracking information is passed on from weather station to another.

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ACTIVITY 7: Hurricane Watch vs Hurricane Warning

MATERIALS:

Paper and Pencils

REFERENCE:

Books listed in Bibliography

PROCEDURE:

Research any of the books listed in the bibliography and determine the difference between a hurricane warning. Have students write a definition of each.

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ACTIVITY 8: The Naming of a Hurricane

MATERIALS:

Paper and Pencils

PROCEDURE:

Hurricanes are named by designating each storm with a feminine name, in alphabetical order. A listing of the hurricanes that occured during 1976 are as follows:

1976 - Anna, Belle, Candice, Dottie, Emmy, Frances, Gloria, Holly, Inga, Jill, Lillie, Maria, Nola, Orpha, Pamela, Ruth, Shirley, Trixie, Vilda, Wynne.

Have each student name the first ten hurricanes of 1978.

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ACTIVITY 9: In India, a Hurricane is Called a ....?

MATERIALS:

World Map

Straight pins

Construction paper

REFERENCE:

1001 Questions Answered About Storms; Tufty, Barbara.

Storms and Man; Ross, Frank.

PROCEDURE:

Have students use the above listed books to determine what hurricanes are called in the following countries:

Japan, India, Australia, and Philippine Islands.

On flags made from the construction paper, write name used for hurricanes by each country and place the flags in the appropriate country.

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ACTIVITY 10: Hurricane Flags

MATERIALS:

Paper
Ruler
Red paint
Black paint
Paint brushes

REFERENCE:

Hurricanes - Monster Storms from the Sea; Brindze, Ruth.
Storms and Man; Ross, Frank.

PROCEDURE:

Hurricane flags are displayed when the velocity of the wind is 74 MPH or greater. Have students locate a picture of a hurricane flag and make a copy of it using the appropriate paints.

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ACTIVITY 11: Outdoor Preparations

MATERIALS:

Paper and pencil

PROCEDURE:

A hurricane warning has been issued for the Savannah area. Have the students answer the following questions:

1. If the power goes out, what foods can you prepare?
2. With no electricity, what will you use as a light source?
3. If there is no electricity, how would you monitor weather reports?
4. If someone in your family is injured can you take care of them until you can get this person to the hospital?

After answering the above questions, have each student prepare a listing of materials that should be kept on hand in case of a hurricane.

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ACTIVITY 14: Red Cross Services

MATERIALS:

None

PROCEDURE:

Invite the Director of Disaster Service to your class for a discussion of how the Red Cross can be of community-assistance before, during and after a hurricane. Contact:

Director of Disaster Services
American Red Cross
422 Habersham Street
Savannah, Georgia 31401

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ACTIVITY 15: Local Effects of a Hurricane

MATERIALS:

None

PROCEDURE:

The winds of a hurricane can reach a velocity in excess of

200 MPH. Rainfall during a hurricane can be so heavy that it is measured in feet instead of inches. Have your students prepare a listing of Chatham County areas that would be easily inundated as a result of a hurricane. Also, have them prepare a listing of structures, natural and man-made that could be possible destroyed by hurricane winds.

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ACTIVITY 16: The Civil Defense

MATERIALS:

None

PROCEDURE:

The Civil Defense is an organization that offers assistance to hurricane devestated communities. Invite a representative of the Civil Defense to your class and discuss the various responsibilities and duties of the organization. Contact:

Office of Civil Defense
Telephone: 912-233-9261

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ACTIVITY 17: Hurricane in Savannah

MATERIALS:

Paper and Pencil

PROCEDURE:

On September 8, 1954, a hurricane struck the City of Savannah. At that time there was neither a local weather bureau nor any national warning systems. Write a brief story about a boy or girl your age living in downtown Savannah. Describe the approaching storm and its resulting damage.

ACTIVITY 18: Death of a Hurricane

MATERIALS:

Map of Northern Hemisphere

REFERENCE:

1001 Questions Answered About Storms; Tufty, Barbara.

Hurricanes and Twisters; Irving, Robert.

PROCEDURE:

The average life span of a hurricane is about 9 days. What makes a hurricane weaken and die? Use the above listed books to determine two reasons why hurricanes die. These reasons are related to particular areas of the northern hemisphere. Using the map, describe the two reasons which contribute to a hurricane's death in the appropriate areas.

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ACTIVITY 19: Seeding a Hurricane

MATERIALS:

Paper

Pencil

REFERENCE:

Storms - From the Inside Out; Weiss, Malcolm.

Hurricanes and Twisters; Irving, Robert.

PROCEDURE:

Using the above listed books, have students answer the following questions:

1. What is meant by seeding a hurricane?

2. How can this procedure pose a problem?

3. Consider what Savannah's streets are like during a heavy rainstorm. If seeding makes for more rainfall would it better to seed a hurricane threatening Savannah or leave the hurricane alone?

ACTIVITY 20: Hurricanes and Tornadoes

MATERIALS:

Paper and Pencil

REFERENCE:

Hurricanes - Monster Storms from the Sea; Brindze, Ruth.

Hurricanes, Storms, Tornadoes; Winchester, James.

PROCEDURE:

Tornadoes sometimes formed from hurricanes and travel along their edges. Use the above books and make a list of precautions that should be taken if a tornado watch is issued.

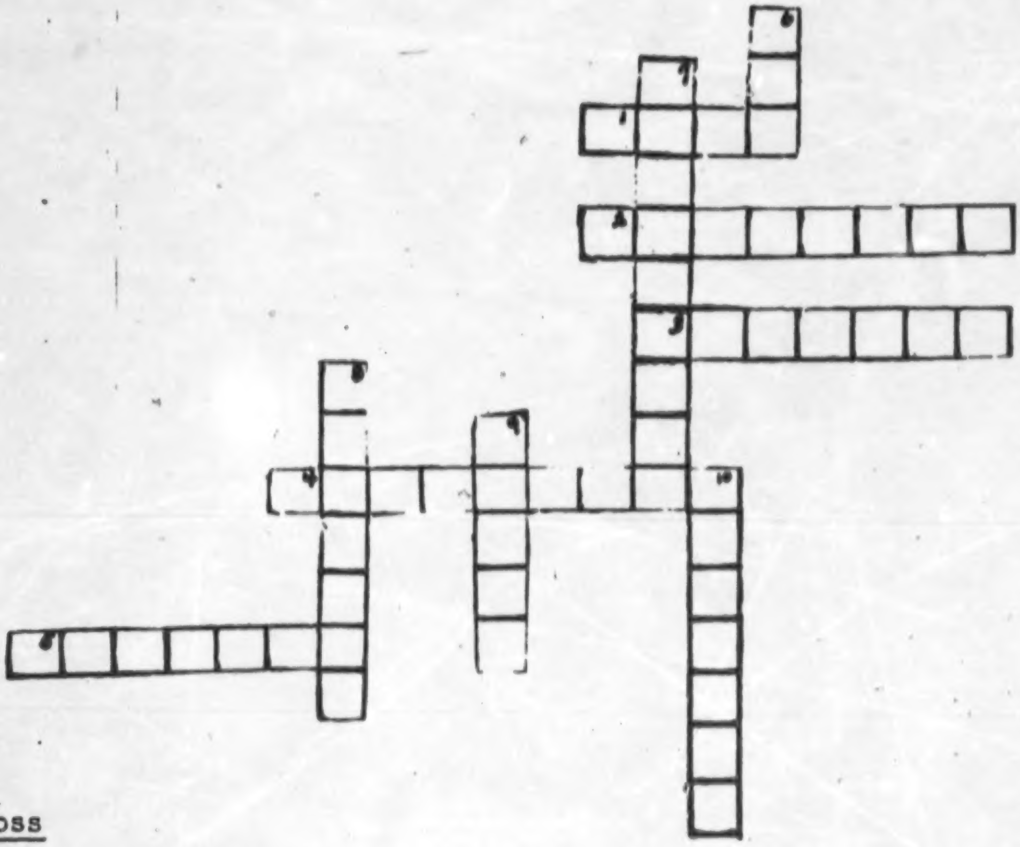
ACTIVITY 21: **Crossword Puzzle**

MATERIALS:

Pencil

PROCEDURE:

Have the students complete the crossword puzzle.



Across

1. Beginning of hurricanes season.
2. Marking a hurricane's movements on a map.
3. Name for hurricanes in India Ocean.
4. Another storm which sometimes forms and travels along the edge of a hurricane.
5. Imaginary line around earth where the water is warmest.

Down

6. The calm center of a hurricane.
7. A storm with high waves and winds of 74 MPH or more.
8. Lines on weather map showing areas of equal air pressure.
9. Means possible danger within 24 hours.
10. Experiment with making rain.

REFERENCE:

Berger, Melvin. The National Weather Service. New York: John Day Company, 1971.

Branley, Franklyn. Sunshine Makes the Seasons. New York: Thomas Crowell Company, 1974.

Brindze, Ruth. Hurricanes - Monster Storms from the Sea. New York: Atheneum, 1973.

Brown, Billy, and Brown Walter. Hurricanes and Tornadoes. Reading, Massachusetts: Addison Wesley Publishing Company, 1972.

Helm, Thomas. Hurricanes: Weather at Its Worst. New York: Dodd, Mead, and Company, 1967.

Irving, Robert. Hurricanes and Twisters. New York: Alfred A. Knopf, 1955.

McCloskey, Robert. Time of Wonder. New York: Viking Press, 1957.

Ross, Frank. Storms and Man. New York: Lothrop, Lee, and Shepard Company, 1971.

Thompson, Philip; O'Brien, Robert; and the Editors of Life. Weather. New York: Time Incorporated, 1965.

Tufty, Barbara. 1001 Questions Answered About Storms. New York: Dodd, Mead and Company, 1970.

Weiss, Malcolm. Storms - From the Inside Out. New York: Julian Messner, 1973.

Winchester, James. Hurricanes, Storms, Tornadoes. New York: G.P. Putnam's Sons, 1968.

FILMS: Can be ordered (from the Georgia Film Catalogue)

1. Operation Hurricane (#4466)
2. Story of Hurricanes (#823)
3. Weather Understanding Storms (#1730)
4. Wind at Work (#803)

MAPS:

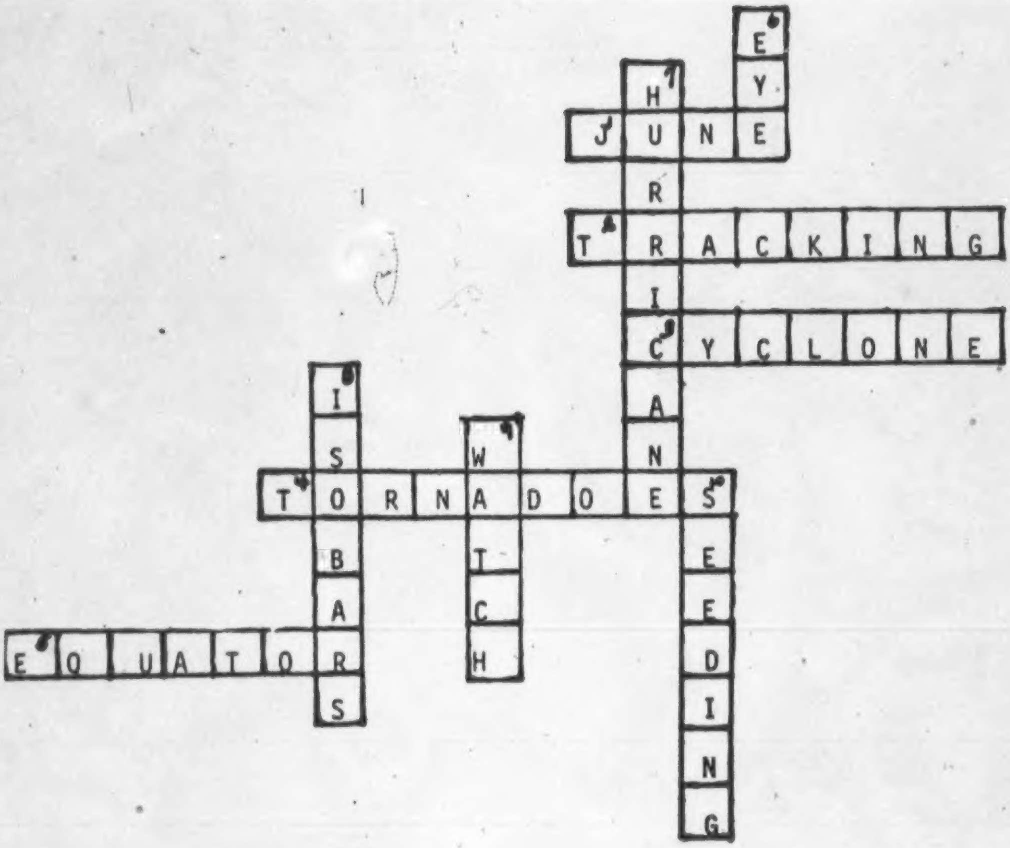
Maps of the United States map.

Map of Coastal Georgia

Map of Northern Hemisphere

World Map

Answer to Crossword Puzzle.


EYE
HURRICANES
JUNE
TRACKING
CYCLONE
ISOBARS
WATCH
TORNADOES
SEEDING
EQUATOR

MATERIALS LIST

Teapot
Electric Hot Plate
Pot Holder
Flashlight
Globe
Bulletin Board Paper
Paint Supplies
Envelopes
Spinning Top
Writing Paper
Postage Stamps
Straight Pins
Construction Paper
Ruler
Marking Pens
Pencils
Projector